JUN 23 1928

The Professional Patriotism and Consciousness Which Has Been Expressed by a Belief in the Service of Pharmacy and the Drug Industries in Giving to the Activities of the Headquarters Should Stimulate and Encourage Others to Do Likewise.

Vol. XVII, No. 6 JUNE, 1928

JOURNAL
OF THE
AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

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THE SEVENTY-SIXTH ANNUAL CONVENTION WILL BE HELD AT PORTLAND, ME., DURING WEEK OF AUGUST 20, 1928.

The 1928 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conferences of Pharmaceutical Association Secretaries will also be held at Portland, same time and place.

For Association Roster and Roster of the Boards of Pharmacy, of Officers of Pharmaceutical Associations, Local Branches, see pages x, xii, xiv, etc.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103. Act of October 3, 1917; authorized July 10, 1918.

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PROGRAM—SEE ALSO PAGE 415 MAY JOURNAL A. PH. A. AND COUNCIL LETTER IN THIS ISSUE.

The following general program for the Seventy-Sixth Annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION and of the 1928 meeting of the affiliated organizations has been approved by the Council and by Local Secretary E. F. Carswell and the General Committee of Arrangements of which Mr. J. H. Dow, of Portland, is the Chairman.

All official sessions of the meeting will be held in the Eastland Hotel, Portland, Me.

SATURDAY, AUGUST 18, 1928.

9.30 A.M.	National Conference on Pharmaceutical Research.
2.00 P.M.	National Conference on Pharmaceutical Research.

MONDAY, AUGUST 20, 1928.

9.00 A.M.	Meeting of the Council, A. Ph. A.
9.00 A.M.	National Association Boards of Pharmacy.
9.00 A.M.	American Association of Colleges of Pharmacy, Teachers' Conferences.—Chemistry Section; Practical Pharmacy Section; Materia Medica, Pharmacognosy and Botany Section; Commercial Pharmacy Section.
2.00 P.M.	National Association Boards of Pharmacy.
2.00 P.M.	American Association of Colleges of Pharmacy.
2.00 P.M.	Visit to the Longfellow Home (for the ladies).
6.00 P.M.	American Association of Colleges of Pharmacy, Dinner.
8.00 P.M.	National Association Boards of Pharmacy.
8.00 P.M.	American Association of Colleges of Pharmacy.
9.30 P.M.	Informal Dance.

TUESDAY, AUGUST 21, 1928.

8.30 A.M.	Joint Session National Association Boards of Pharmacy and American Association of Colleges of Pharmacy.
1.30 P.M.	First Session House of Delegates, A. Ph. A.
2.00 P.M.	Auto Trip to Fort Williams (for the ladies).
2.30 P.M.	National Association Boards of Pharmacy.
2.30 P.M.	American Association of Colleges of Pharmacy.
6.30 P.M.	American Pharmaceutical Association—Banquet, followed by dancing.

WEDNESDAY, AUGUST 22, 1928.

9.00 A.M.	First General Session, A. Ph. A.
2.00 P.M.	House of Delegates, A. Ph. A.
2.00 P.M.	Card Party (for the ladies).
4.30 P.M.	Conference of Pharmaceutical Association Secretaries.
8.00 P.M.	First Session Scientific Section. First Session Section on Commercial Interests. First Session Section on Historical Pharmacy.
9.30 P.M.	Informal Dance.

THURSDAY, AUGUST 23, 1928.

9.00 A.M.	Council, A. Ph. A.
9.00 A.M.	First Session Section on Education and Legislation. First Session Section on Practical Pharmacy and Dispensing. Second Session Section on Historical Pharmacy.
12.00 M.	Luncheon of Veteran Druggists.
2.00 P.M.	General Session, A. Ph. A.
2.30 P.M.	Auto Ride (for the ladies).
4.30 P.M.	Conference of Pharmaceutical Association Secretaries.
8.00 P.M.	Joint Session Scientific Section and the Section on Practical Pharmacy and Dispensing. Second Session Section on Commercial Interests.
8.00 P.M.	Card Party (for the ladies).

FRIDAY, AUGUST 24, 1928.

9.00 A.M.	House of Delegates, A. Ph. A.
1.15 P.M.	Organ Recital (Municipal Organ) in City Hall.
2.30 P.M.	Second Session Scientific Section. Second Session Section of Practical Pharmacy and Dispensing. Second Session Section on Education and Legislation.
7.00 P.M.	Final Session House of Delegates.
9.00 P.M.	Final General Session, A. Ph. A.
10.30 P.M.	Reorganization Meeting of the Council, A. Ph. A.

SATURDAY, AUGUST 25, 1928.

10.30 A.M.	Sail among the Islands in Casco Bay, followed by a Grand Shore Dinner.

ADDITIONAL INFORMATION.

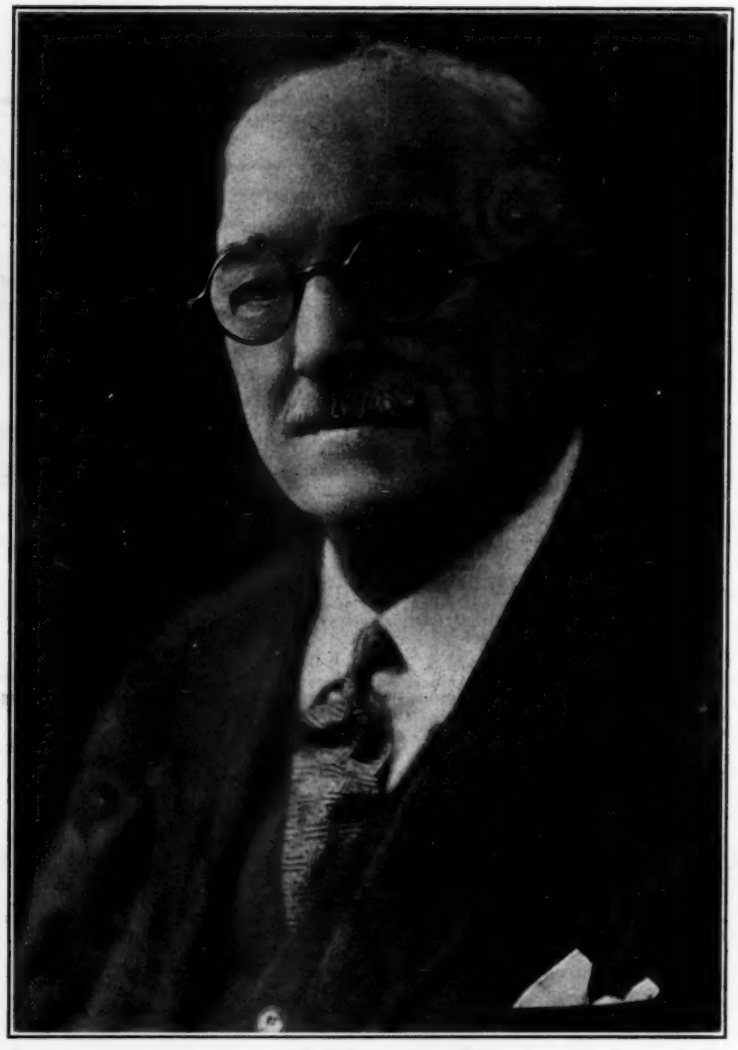
The **National Conference of Pharmaceutical Research** will hold its annual meeting in Eastland Hotel, August 18, 1928.

The **Plant Science Seminar** will meet at the Massachusetts College of Pharmacy, Boston, Mass., during the week of August 13, 1928.

The **Kappa Psi Fraternity** will hold its annual meeting in the Eastland Hotel, Portland, Me., during the week of August 13, 1928.

The **Phi Delta Chi Fraternity** will have a dinner at the Eastland Hotel, Portland, Me., on Wednesday, August 22, 1928, at 6.00 P.M.

The **Second Symposium on the Genus Mentha** will be held at the Eastland Hotel, Portland, Me., during the week of August 20, 1928.



EDWARD WHEELOCK RUNYON.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XVII JUNE, 1928 No. 6

EDWARD WHEELOCK RUNYON.

Edward Wheelock Runyon is listed among those who have held membership in the AMERICAN PHARMACEUTICAL ASSOCIATION for more than fifty years—Mr. Runyon became a member in 1875.

The subject of this brief sketch was born in Chicago, November 7, 1851. At the age of 16 years he came to New York and served apprenticeship in a Greenwich Village pharmacy. In 1871 he matriculated at the New York College of Pharmacy and was graduated by this institution in 1873. He removed to San Francisco in 1877 and established the first pharmaceutical laboratory on the Pacific Coast for the manufacture of fluidextracts, gelatin-coated pills and other pharmaceutical preparations. He is now President of Boericke & Runyon, Inc., engaged in the manufacture of homeopathic and other pharmaceutical preparations and publishers of medical books.

From 1883 to 1893 Mr. Runyon was professor of Pharmacy and dean of the Faculty of California College of Pharmacy, a Department of the University of California. He was a Vice-President of the AMERICAN PHARMACEUTICAL ASSOCIATION 1883–1884 and its Local Secretary for the meeting of 1889, held in San Francisco.

Mr. Runyon is a member of the New York Chamber of Commerce, the American Museum of Natural History, the New York Zoölogical Society, the New York Aquarium Society, the New York Microscopical Society, the Lotos and the Chemists' Club. The veteran member enjoys good health and is active in the affairs of the business of which he is the head.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase St., BALTIMORE, MD.

THE ESSENTIAL CHARACTER OF PHARMACY.

FIFTY years ago the British pharmacist, J. Ince, in an address before the South London School of Pharmacy, defined pharmacy as a special science, as the study of such preparations, processes, and their applications as are concerned in the art of medicine. He said, "The knowledge of their application leads us directly to the grand art of dispensing, and a mastery over that art is indispensable to every pharmacist. The way in which the various preparations and processes enjoined are used, combined, assisted, or controlled by the physician, the mode in which his instructions may be best carried out, his directions followed, and his intentions by such processes on other remedies forming the compound ingredients of a prescription, is a second but an essential pharmacy, and without which the definition is incomplete. See what happens. There ensues inevitably a mutual understanding between the physician and the pharmacist. Both respect each other, and respect is the basis of true friendship. Am I not right, therefore, in saying that though without chemistry we cannot move a step, and though materia medica and botany are necessary to our education, yet that pharmacy has a province of its own—one of paramount importance—and one which we are bound to learn thoroughly if we would know our own business, and hope for ultimate success?"

Recently, we read an instructive address before the New Jersey College of Pharmacy by our fellow member F. W. Nitardy, wherein he points out, in a helpful way, the progress made in the laboratories toward standardization of a very large part of the materia medica, and, in connection therewith, discussed the opportunities and activities of pharmacists of the present day, which are as important as ever to dispensers of medicines.

The progress of the scientific development of materia medica will not be slowed, except to the extent that it is subject to such further investigation, study and research as experience and ethical guidance directs.

Dr. H. H. Dale delivered an address before an Evening Meeting of the Pharmaceutical Society of Great Britain, March 13, 1928, entitled "Some Reactions of Pharmacology on Pharmacy," wherein the significance of the change in chemical therapeutics is given comprehensive consideration. He views these as symptoms of one common and fundamental change due to the transfer of the initiative in therapeutic advance from the bedside to the laboratory. In his further remarks he discussed laboratory research illustrated by such important drugs as Ipecac and Ergot and their constituents, and pointed out how these have been influential factors in the development.

The aim of the professions is to serve and pharmacy will adapt itself to the changing conditions, just as it did fifty years ago, and "to serve well" marks the character of pharmacy; in that service a coöperation of all the activities is most essential. Pharmacy must change with therapeutic and, to some extent, with surgical practice; the pharmacy schools, therefore the faculties must, as never before, keep in touch with the advances and changes going on. Pharmacy has

always supplied the knowledge concerning drugs and preparations required by the doctor and it will move on with the new orientation of therapeutics but mindful that desire and over-enthusiasm are sometimes a hindrance to progress. Correspondingly, in the education of the young pharmacist the older curriculum cannot be set aside; it is an essential part of the new, associated with the curriculum entailing knowledge and training which develop an understanding of the lines of evolution in the production of materia medica and of methods by which "their therapeutic value is detected and investigated, before they reach the stage of clinical application."

Mere contact with a piece of research work does not make the scientist.—
E. G. E.

GLYN-JONES MEMORIAL IS PLANNED BY BRITISH PHARMACEUTICAL BODIES.

A memorial of some sort to perpetuate the name of the late Sir William Glyn-Jones, father of the British Proprietary Articles Trade Association and a leader of British pharmacy for many years, is planned by a group of leaders of various British associations in the drug trade.

An appeal for funds and for suggestions as to the form the memorial shall take has been issued by Herbert Skinner, President of the Pharmaceutical Society of Great Britain; Harvey P. Arthur, Chairman of the North British Executive; Alfred Higgs, President of the Proprietary Articles Trade Association; J. E. French, Chairman of the Chemists' Defense Association; and D. Lloyd Howard, Chairman of the Drug and Fine Chemical Manufacturers' Association.

A number of suggestions are under consideration, we mention two: A memorial scholarship, possibly post-graduate, to enable a pharmaceutical chemist to spend one or two years in research work in a foreign University, or to provide for the pharmaceutical education of a student unable to qualify without financial assistance.

A Glyn-Jones Memorial Lecture, to be given at the British Pharmaceutical Conference or alternating with the Harrison Memorial Lecture, with a memorial medal for the lecturer.

It has been stated that the Council of the Pharmaceutical Society proposes to erect a memorial in the Society's House from the Society as a body.

Provision for a Glyn-Jones Memorial Lecture seems timely and it is suggested that visitations be provided to pharmaceutical organizations abroad. Sir William was an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION and attended its Philadelphia meeting. American pharmacists have not forgotten his efforts in Canada, where he labored without ceasing until illness prevented him, for the betterment of retail drug trade conditions.

Suggestions and subscriptions should be addressed to the Secretary of the Pharmaceutical Society of Great Britain, at 17 Bloomsbury Square W. C. 1, London, England.

SCIENTIFIC SECTION

FLUECKIGER'S TEST FOR THYMOL AND CARVACROL.*

BY H. G. HEWITT.

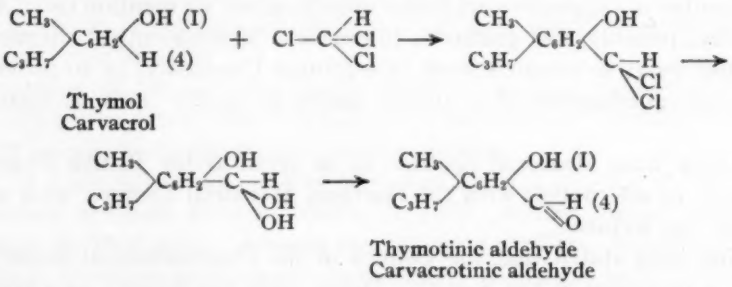
This test consists in acting on the substance to be tested, in chloroform solution, with solid sodium or potassium hydroxide and heating the reaction mixture gently. The presence of either phenol is indicated by the red coloration of the chloroform solution. The test will indicate 0.01 g. of thymol in 20 drops of chloroform with a fiery red color.[1]

The color reaction is based on two distinct types of reactions:

(*1.*) The formation of thymotinic and carvacrotinic aldehyde, respectively; and

(*2.*) The reaction between these aldehydes and the excess of the respective phenol resulting in the formation of CH: $(C_{10}H_{12}OH)_3$, one of the rosalic acid dyes.[2]

(*ad 1.*) That chloroform acts on phenols in the presence of sodium or potassium hydroxide with the synthesis of a hydroxy aldehyde was first observed by Reimer and Tiemann in 1876[3], who thus prepared hydroxy benzoic aldehyde. It has since become a general method for the preparation of hydroxy aldehydes,[4] as the corresponding use of CCl_4 has been employed as a general method for the preparation of the hydroxy[5] acids since this reaction was first applied to the hydroxy benzoic acids by Reimer and Tiemann in 1876.[6] The chloroform reaction was first applied by Hans Kobek to thymol in 1883[7] and by Edward Nordmann to carvacrol in 1884.[8] The several steps of the reaction become apparent from the following formulas:



Thymol
Carvacrol

Thymotinic aldehyde
Carvacrotinic aldehyde

(*ad 2.*) The second phase of the color reaction can be expressed by the following formula:

---

* Scientific Section, A. PH. A., St. Louis meeting, 1927.

[1] Flueckiger, "Reactionen" (1892), 156.

[2] Georgievics and Grandmougin, "A Textbook of Dye Chemistry" (1920), 182.

[3] *Ber.*, 9, 1268.

[4] "Comp. Meyer-Jacobsen, Org. Chem.," Bd. 2, I, 516.

[5] Same references.

[6] *Ber.*, 9, 1285.

[7] *Ibid.*, 16, 2096.

[8] *Ibid.*, 17, 2632.

$$CH_3.C_3H_7.OH.C_6H_2.CH\begin{matrix}O\\ \\ \end{matrix}+\begin{matrix}H\\ \\ H\end{matrix}\begin{matrix}C_6H_2.CH_3.C_3H_7.OH\\ \\ C_6H_2.CH_3.C_3H_7.OH\end{matrix}\longrightarrow CH:(C_6H_2.CH_3.C_3H_7.OH)_3$$

To use these reactions as a qualitative color test for either phenol appears to have been first suggested by Flueckiger[1] in 1888.

PHYTOCHEMICAL NOTES.*†

NO. 100. THE COROLLA OF MONARDA FISTULOSA L.

BY KARL H. RANG.

The corolla of this species has been subjected to chemical examination but once, *viz.* in 1903, and then only to a very partial and preliminary study.[1] Upon distillation, 340 Gm. of dried corollas yielded 9.24 Gm. or 2.71 p. c. of a dark reddish brown oil, the density of which (0.9586) indicated a high percentage of carvacrol and its oxidation products. Flueckiger's test gave a positive reaction for the monatomic phenol, the only substance indentified according to the report. The presence of quinhydrone, however, was assumed with little or no doubt. This assumption was later justified when quinhydrone crystals actually separated from the oil exposed to winter temperature. Upon keeping in a closed specimen bottle with cotton as a background for the blackish crystals, they changed color in the course of time. The thymoquinone part of the quinhydrone molecule apparently sublimed staining the cotton a light yellow, leaving the white crystals of hydrothymoquinone.[2]

In the summer of 1915 a considerable number of florets were collected and carefully garbled, but unfortunately no one was found to work with this valuable material.

During the summer of 1924 as much as 498 Gm. of dry florets were collected, for the most part about Madison. This material was used in the following experiments.

Moisture Determination.—The xylene method[3] was employed using a sufficient amount of hydrocarbon (250 cc.) to leave in the distilling flask enough solvent to cover the florets after all of the moisture had been driven over. Ten-Gm. samples of fresh florets, pickled in xylene as rapidly as the material was collected, yielded 7.5 cc., 7.8 cc. and 7.8 cc., respectively of water, hence 75 p. c., 78 p. c. and 78 p. c., respectively of moisture. This is appreciably higher than the moisture content of the corollas of *Monarda punctata* L. as found by Hewitt.

The air-dried material yielded 0.45 cc. of water in each of three experiments,

---

[1] Flueckiger, "Pharm. Chemie," 2, 101.

* Scientific Section, A. PH. A., St. Louis meeting, 1927.

† From the laboratory of Edward Kremers.

[1] J. J. Beck, "Oil from the Corolla of Monarda Fistulosa," *Ph. Rev.*, 21, 111.

[2] Unpublished results.

[3] Bulletin No. 134, Forest Service. A. S. Dean, "The Estimation of Moisture in Creosoted Wood."

hence contains 4.5 p. c. of moisture. This is somewhat lower than the moisture content of the air-dried florets of *Monarda punctata* L. as found by Hewitt.

The distillation being ended, the xylene remaining in the flask was filtered while hot and the filtrate allowed to cool and to evaporate spontaneously. Upon cooling a few white crystals separated from each of the filtrates. The crystals from the combined and evaporated xylene filtrates, after recrystallization from water, melted at 235–237°. When heated, they charred thus revealing their organic nature.

The distillate was separated into its aqueous portion and into its hydrocarbon portion. Neither of the separated distillates, however, gave a test for carvacrol with Flueckiger's reagent.[1] That the xylene does not interfere with this test for thymol and carvacrol was established by experiment.

Ash Determination.—The air-dried florets were used.

I. 0.4992 Gm. of florets yielded 0.0123 Gm. of water-insoluble ash, 0.0405 Gm. of total ash, hence 0.0282 Gm. of water-soluble ash by difference.

II. 0.5000 Gm. of florets yielded 0.0142 Gm. of water-insoluble ash, 0.0404 Gm. of total ash, hence 0.0262 Gm. of water-soluble ash by difference.

III. 0.5007 Gm. of florets yielded 0.0140 Gm. of water-insoluble ash, 0.0408 Gm. of total ash, hence 0.026 Gm. of water-soluble ash by difference.

The percentages are herewith tabulated:

	I.	II.	III.
Total ash	8.11 p. c.	8.08 p. c.	8.10 p. c.
Water-insoluble ash	2.46 p. c.	2.84 p. c.	2.79 p. c.
Water-soluble ash	5.65 p. c.	5.24 p. c.	5.31 p. c.

Comparison with the ash content of the florets of *Monarda punctata* L. reveals that whereas the total ash content of those of *M. punctata* L. is about two per cent higher, the water-soluble ash content, however, is lower by one per cent and more. Taking into consideration the totally different types of soil on which these two species grow, *M. punctata* L. on sandy soil and *M. fistulosa* L. on clay soil, this difference may not be without significance.

Volatile Oil.—Four hundred and thirty-eight Gm. of air-dried florets were distilled with steam. The aqueous distillate was cohobated three times. The total oil, original oil plus that from the cohobations, amounted to 13.2 Gm. or 3.1 p. c. The original oil was of a deep red color, that from the first cohobation was a lighter red and the oils from the second and third cohobations were yellow with a red tinge thus revealing the lesser solubility of the pigments in water. The amounts, however, were by far too small in each case for separate investigation, hence the oils were mixed. The mixed oil was deep red in color. The density of the oil was 0.9740 at 23.3°. The specific gravity of this oil was higher than that of the oil distilled by J. J. Beck (1903)[2] *viz.* 0.9586. It is also higher than the specific gravity of the corolla oil of *M. punctata* L. distilled by Hewitt from corollas in 1924.

---

[1] Flueckiger's reagent consists of a piece of sodium hydroxide in chloroform. On addition of carvacrol or thymol a wine-red color is formed at the surface of the sodium hydroxide.

[2] *Ph. Rev.*, 21, 111.

The oils from three distillations being available they were diluted separately with heptane to precipitate any hydrothymoquinone present if possible. The ratios of oil to heptane were 1:1, 1:2 and 1:3, respectively. In no instance, however, was any hydrothymoquinone precipitated, even when more heptane was added and the solution exposed to the cold. While this does not show the absence of diatomic phenol, it indicates that but little hydrothymoquinone at most can be present.

The heptane solution of the third of these oils (8.8 cc. of oil in 26.4 cc. of heptane = 35.2 cc. of solution) was shaken with 5 p. c. aqueous KOH solution. 3.2 cc. of phenol were dissolved out by the aqueous alkali indicating a volume percentage of 36.3 p. c. of phenol. The heptane solutions of oils 1 and 2 combined (4.8 cc. of oil in 12.7 cc. of heptane = 17.5 cc. of solution) when treated in like manner gave up 1.7 cc. of phenol, corresponding to a volume percentage of 35.4 cc. These figures show considerable difference in the corolla oils examined.

From the aqueous phenylate solutions the phenols were regenerated. They were reddish brown in color. However, the amount of material was too small for satisfactory investigation.

The heptane solution of the non-phenols was heated to 100° to remove the solvent and the residue in the flask subjected to steam distillation. The resulting oil was likewise reddish brown in color and too small in amount for detailed investigation.

Both phenol and non-phenol portions were tested for thymol and carvacrol with Flueckiger's test. As was to be expected, the phenol portion gave a positive test, the non-phenol a negative test. A rough melting-point determination of the phenol made with a drop of oil suspended on a thermometer and frozen gave +1°, thus identifying it with carvacrol.

A color test[1] for monohydroxy thymoquinone gave a positive test with the phenol portion, a negative test with the non-phenol portion.

Like tests for dihydroxy thymoquinone gave negative indications in both cases.

Alcoholic Extract.—When extracted with hot alcohol, the corollas from which the oil had been distilled yielded a brownish red filtrate from which a flocculent precipitate separated upon cooling.[2] Evaporation of the alcohol yielded more, but the total amount was small. The substance melted at 139–141°. When burned it charred with intumescence.

The alcoholic filtrate from the corollas previously extracted with xylene (moisture determinations) was much lighter in color and upon cooling yielded no flocculent precipitate. However, upon evaporation such was obtained. It melted at 235–237°, but did not intumesce. It charred thus revealing its organic character.

---

[1] A control test with monohydroxythymoquinone made by adding aqueous lead acetate to an alcoholic solution gave a red precipitate. See Wakeman, "The Higher Oxidation Products of Thymoquinone." Proc. A. PH. A., 58 (1910), 979.

[2] A control test with dihydroxythymoquinone made by adding aqueous lead acetate to an alcoholic solution thereof gave a green precipitate.

THE EFFECT OF CEANOTHYN UPON THE KIDNEY AND LIVER OF THE DOG.

BY THEODORE KOPPÁNYI.*

In view of the fact that the hemostatic substance, Ceanothyn, has been widely used clinically and no *acute* ill effects have been noted, it seemed desirable to investigate the effects of *prolonged* administration of the drug, especially with reference to its action upon the kidneys and liver. The Ceanothyn (*i. e.*, an extract containing the alkaloids of the plant, *Ceanothus americanus*), was given to us by Guy C. Taylor, and this preparation was used throughout the whole experiment.

Methods.—Three dogs were used, and the drug was administered to them by stomach tube. In no case did the ingestion of the drug cause any acute nausea or vomiting. The nature of the work undertaken necessitated repeated catheterization of the animals, and, therefore, female dogs were selected and episiotomy was performed in each of them. The effect of the drug upon the kidney was determined by Rowntree's phenol-sulphon-phthalein test, and by necropsy and histological examination, whereas its action upon the liver was determined solely by gross and microscopical examination of that organ.

Experimental.—The three episiotomized bitches were subjected to kidney function test.

Dog A excreted within the first two hours 65.2% of the intravenously injected dye (the phenol-sulphon-phthalein, mono-sodium salt solution—Hynson, Westcott & Dunning).

Dog B excreted 71.2% within two hours.

Dog C excreted 72.5% of the dye within the first two hours.

Excluding some preliminary experimentation, all three dogs were given the drug daily (excepting Sundays) from July 6th until July 25th. The daily dosage of the orally administered drug was 125 cc., excepting the last four days, when they received only 100 cc. of the fluid. The total dosage for each animal was approximately 1900 cc.

Results.—*Dog A* was subjected to the kidney function test on July 23rd, when she excreted during the first two hours 68.9% of the dye, and later, on July 25th, the excretion of the dye during the first two hours amounted to 70.5%. In all cases, the urine was tested for albumen and found to be negative. On July 26th the dog was killed for anatomical and histological examinations.

Dog B excreted, on July 23rd, 64.5% of the dye, and on July 25th, 68.5% during the first two hours. Albumen test negative.

Dog C excreted, on July 23rd, 66%, and on July 25th, 68.5% of the dye during the first two hours, and the urine contained no albumen.

Both dogs (*B* and *C*) are alive and well at the present writing (August 26th). Neither of them has lost any weight.

The intake of the drug by the dogs did not produce any pathological changes in the kidneys, as determined by the kidney function test. This result was corroborated by the gross and histological examination of the kidneys of *Dog A*.

* The Hull Physiological Laboratory of the University of Chicago.

The examination (in which I was aided by Doctors Maximow and Cannon, of the University of Chicago) revealed that there were no intracellular infiltrations, no casts or blood in the tubules, and both the glomeruli and tubules appeared to be normal. The liver showed no trace of necrosis, and differed in no respect from that of a normal dog.

CONCLUSIONS.

Ceanothyn, administered orally to dogs in doses thirty to forty times the daily human dose, over a period of seventeen days, produced no detectable impairment of the kidneys and liver in the dog as shown by functional tests and morphological studies.

HYDROGEN-ION CONCENTRATION AND p_H.

(COLORIMETRIC DETERMINATIONS. PAPER II.)

BY A. LEE CALDWELL.

There are so many articles on making hydrogen-ion or p_H determinations that one hesitates to add to that number. However, each writer has his personal claims to merits of the methods that he advocates. Perhaps it should be said that there is, primarily, but one colorimetric method, and that this one method has many modifications, the entire success of which depends upon the reactions of certain indicators with acid and alkaline solutions. A great many forward steps have been taken in the development of indicators which show two distinct colors and all the variations between the two colors, dependent of course upon the hydrogen-ion concentration for the change of color. It will not be necessary here to go into detail regarding the theory of indicator properties. Even if it were attempted there could be nothing more than a general or "planket" decision made as to the why and wherefore of indicator action. Ostwald, who proposed the theory that molecular rearrangement was the cause of the color change, has not been disproven, although many other investigations have revealed additional causes.

The old and useful indicators of vegetable and animal origin, such as litmus and cochineal, are rapidly being replaced in the fields of acidimetry and alkalimetry, for many indicators react more easily to small amounts of acid or alkali and their uses are varied. Litmus is still useful but hardly has a place in control work of chemicals and pharmaceuticals. The most widely used indicators and the best for work in all fields are the sulphon-phthalein indicators, and they are the ones which will be discussed in this paper.

It might be well to emphasize the need of using indicators of reliable make and the necessity of checking the determinations with at least two indicators. Necessary to the determination of the p_H are standard buffer solutions with which the unknown solutions may be compared. Buffer solutions are solutions of acids or alkalies together with salts of these acids or alkalies, in most cases, sufficient to give a concentration producing the desired p_H and to withstand the effects of small amounts of acid or alkali with which they may come in contact. The most generally used and easily prepared buffers are those of Clark and Lubs (*J. Biol. Chem.*, 25 (1916), 479). They are prepared as follows:

p_H.			
1.2	50 cc. $M/5$ KCl	64.5 cc. $M/5$ HCl	Dilute to 200 cc.
1.4	50 cc. $M/5$ KCl	41.5 cc. $M/5$ HCl	Dilute to 200 cc.
1.6	50 cc. $M/5$ KCl	26.3 cc. $M/5$ HCl	Dilute to 200 cc.
1.8	50 cc. $M/5$ KCl	16.6 cc. $M/5$ HCl	Dilute to 200 cc.
2.0	50 cc. $M/5$ KCl	10.6 cc. $M/5$ HCl	Dilute to 200 cc.
2.2	50 cc. $M/5$ KCl	6.7 cc. $M/5$ HCl	Dilute to 200 cc.
2.2	50 cc. $M/5$ KH Phthalate	46.70 cc. $M/5$ HCl	Dilute to 200 cc.
2.4	50 cc. $M/5$ KH Phthalate	39.60 cc. $M/5$ HCl	Dilute to 200 cc.
2.6	50 cc. $M/5$ KH Phthalate	32.95 cc. $M/5$ HCl	Dilute to 200 cc.
2.8	50 cc. $M/5$ KH Phthalate	26.42 cc. $M/5$ HCl	Dilute to 200 cc.
3.0	50 cc. $M/5$ KH Phthalate	20.32 cc. $M/5$ HCl	Dilute to 200 cc.
3.2	50 cc. $M/5$ KH Phthalate	14.70 cc. $M/5$ HCl	Dilute to 200 cc.
3.4	50 cc. $M/5$ KH Phthalate	9.90 cc. $M/5$ HCl	Dilute to 200 cc.
3.6	50 cc. $M/5$ KH Phthalate	5.97 cc. $M/5$ HCl	Dilute to 200 cc.
3.8	50 cc. $M/5$ KH Phthalate	2.63 cc. $M/5$ HCl	Dilute to 200 cc.
4.0	50 cc. $M/5$ KH Phthalate	0.40 cc. $M/5$ NaOH	Dilute to 200 cc.
4.2	50 cc. $M/5$ KH Phthalate	3.70 cc. $M/5$ NaOH	Dilute to 200 cc.
4.4	50 cc. $M/5$ KH Phthalate	7.50 cc. $M/5$ NaOH	Dilute to 200 cc.
4.6	50 cc. $M/5$ KH Phthalate	12.15 cc. $M/5$ NaOH	Dilute to 200 cc.
4.8	50 cc. $M/5$ KH Phthalate	17.70 cc. $M/5$ NaOH	Dilute to 200 cc.
5.0	50 cc. $M/5$ KH Phthalate	23.85 cc. $M/5$ NaOH	Dilute to 200 cc.
5.2	50 cc. $M/5$ KH Phthalate	29.95 cc. $M/5$ NaOH	Dilute to 200 cc.
5.4	50 cc. $M/5$ KH Phthalate	35.45 cc. $M/5$ NaOH	Dilute to 200 cc.
5.6	50 cc. $M/5$ KH Phthalate	39.85 cc. $M/5$ NaOH	Dilute to 200 cc.
5.8	50 cc. $M/5$ KH Phthalate	43.00 cc. $M/5$ NaOH	Dilute to 200 cc.
6.0	50 cc. $M/5$ KH Phthalate	45.45 cc. $M/5$ NaOH	Dilute to 200 cc.
6.2	50 cc. $M/5$ KH Phthalate	47.00 cc. $M/5$ NaOH	Dilute to 200 cc.
5.8	50 cc. $M/5$ KH_2PO_4	3.72 cc. $M/5$ NaOH	Dilute to 200 cc.
6.0	50 cc. $M/5$ KH_2PO_4	5.70 cc. $M/5$ NaOH	Dilute to 200 cc.
6.2	50 cc. $M/5$ KH_2PO_4	8.60 cc. $M/5$ NaOH	Dilute to 200 cc.
6.4	50 cc. $M/5$ KH_2PO_4	12.60 cc. $M/5$ NaOH	Dilute to 200 cc.
6.6	50 cc. $M/5$ KH_2PO_4	17.80 cc. $M/5$ NaOH	Dilute to 200 cc.
6.8	50 cc. $M/5$ KH_2PO_4	23.65 cc. $M/5$ NaOH	Dilute to 200 cc.
7.0	50 cc. $M/5$ KH_2PO_4	29.63 cc. $M/5$ NaOH	Dilute to 200 cc.
7.2	50 cc. $M/5$ KH_2PO_4	35.00 cc. $M/5$ NaOH	Dilute to 200 cc.
7.4	50 cc. $M/5$ KH_2PO_4	39.50 cc. $M/5$ NaOH	Dilute to 200 cc.
7.6	50 cc. $M/5$ KH_2PO_4	42.80 cc. $M/5$ NaOH	Dilute to 200 cc.
7.8	50 cc. $M/5$ KH_2PO_4	45.20 cc. $M/5$ NaOH	Dilute to 200 cc.
8.0	50 cc. $M/5$ KH_2PO_4	46.80 cc. $M/5$ NaOH	Dilute to 200 cc.
7.8	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	2.61 cc. $M/5$ NaOH	Dilute to 200 cc.
8.0	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	3.97 cc. $M/5$ NaOH	Dilute to 200 cc.
8.2	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	5.90 cc. $M/5$ NaOH	Dilute to 200 cc.
8.4	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	8.50 cc. $M/5$ NaOH	Dilute to 200 cc.
8.6	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	12.00 cc. $M/5$ NaOH	Dilute to 200 cc.
8.8	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	16.30 cc. $M/5$ NaOH	Dilute to 200 cc.
9.0	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	21.30 cc. $M/5$ NaOH	Dilute to 200 cc.
9.2	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	26.70 cc. $M/5$ NaOH	Dilute to 200 cc.
9.4	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	32.00 cc. $M/5$ NaOH	Dilute to 200 cc.
9.6	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	36.85 cc. $M/5$ NaOH	Dilute to 200 cc.
9.8	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	40.80 cc. $M/5$ NaOH	Dilute to 200 cc.
10.0	50 cc. $M/5$ H_3BO_3, $M/5$ KCl	43.90 cc. $M/5$ NaOH	Dilute to 200 cc.

Large quantities of the fifth molar solutions may be made up at one time and may serve as convenient stock solutions to have ready when it is desired

to replace or replenish the more dilute buffer solutions. Redistilled water should be used unless the water was at first distilled slowly from a very good still supplied with steam under pressure. The salt should be recrystallized at least three times and the sodium hydroxide should be prepared by dissolving it in an equal weight of water in a pyrex flask and allowing it to stand until the carbonate settles out. This solution should be filtered through glass wool with suction and diluted with previously boiled distilled water to approximately *M/5* and a small quantity of this solution titrated. It is more convenient to use a factor than to make an exactly *M/5* solution. The hydrochloric acid *M/5* may be prepared by diluting a reagent quality HCl to *M/5* and determining the factor by precipitation with silver chloride. The salts should be dried before using at the temperatures here given.

	Dry at.	For *M/5* sol.
Acid potassium phthalate	110–115° C.	40.83 Gm. per L.
Potassium chloride	120° C.	14.91 Gm. per L.
Acid potassium phosphate	110–115° C.	27.23 Gm. per L.

Boric acid dry in desiccator over $CaCl_2$. (For boric acid *M/5*, potassium chloride *M/5* use boric acid 12.40 Gm. and potassium chloride 14.91 Gm. per L.)

All stock solutions as well as the standard buffer solutions should be protected from CO_2 and air and from alkali by using pyrex or non-sol glassware.

The indicator solutions consists of 0.04% solutions of the indicator. Sodium hydroxide is used in making up these solutions in order to give the alkali salt of the indicator which is adjudged the most reliable form by Clark and Lubs. Following are the sulphon-phthalein indicators:

		p_H.
Thymol-sulphon-phthalein	Thymol blue	1.2–2.8 8.2–9.8
Tetra-brom-phenol-sulphon-phthalein	Brom phenol blue	3.0–4.6
Tetra-brom-*m*-cresol-sulphon-phthalein	Brom cresol green	3.8–5.4
Di-chlor-phenol-sulphon-phthalein	Chlor phenol red	5.0–6.6
Di-brom-cresol-sulphon-phthalein	Brom cresol purple	5.4–7.0
Di-brom-thymol-sulphon-phthalein	Brom thymol blue	6.0–7.6
Phenol-sulphon-phthalein	Phenol red	6.6–8.2
Ortho-cresol-sulphon-phthalein	Cresol red	7.2–8.8
m-Cresol-sulphon-phthalein	*m*-Cresol purple	7.4–9.0

These are the indicators that appear in "The Determination of Hydrogen Ions" 2nd edition, by Wm. M. Clark (see also *U. S. Public Health Reports* (Dec. 1926), 3051–75). Although other very useful indicators have been synthesized, these are the principal ones.

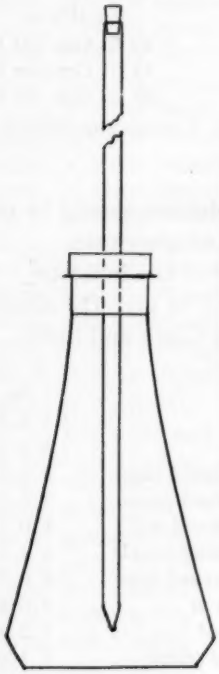
METHOD OF PREPARING INDICATOR SOLUTIONS.

Thymol blue	20 mg.	*N*/50 NaOH	2.15 cc.	Water to make 50 cc.
Brom phenol blue	20 mg.	*N*/50 NaOH	1.50 cc.	Water to make 50 cc.
Brom cresol green	20 mg.	*N*/50 NaOH	1.40 cc.	Water to make 50 cc.
Chlor phenol red	20 mg.	*N*/50 NaOH	2.35 cc.	Water to make 50 cc.
Brom cresol purple	20 mg.	*N*/50 NaOH	1.85 cc.	Water to make 50 cc.
Brom thymol blue	20 mg.	*N*/50 NaOH	1.60 cc.	Water to make 50 cc.
Phenol red	20 mg.	*N*/50 NaOH	2.85 cc.	Water to make 50 cc.
Cresol red	20 mg.	*N*/50 NaOH	2.65 cc.	Water to make 50 cc.
Meta cresol purple	20 mg.	*N*/50 NaOH	2.65 cc.	Water to make 50 cc.

The writer has kept the standard solutions as well as the indicator solutions in pyrex flasks fitted with rubber stoppers holding a delivery tube as illustrated, Fig. 1. It is necessary to keep the delivery tube stoppered to prevent exposure of the solutions to air and laboratory fumes. After removing the small stopper from the delivery tube a slight pressure on the rubber stopper will fill the tube.

METHOD OF DETERMINATION.

A convenient quantity of the unknown solution is taken in a test-tube and to this is added the desired amount of indicator solution. Clark suggests five drops of indicator to 10 cc. of solution, which is empirical in that the drops used by different workers will vary in size. This, however, is no criticism for it is understood



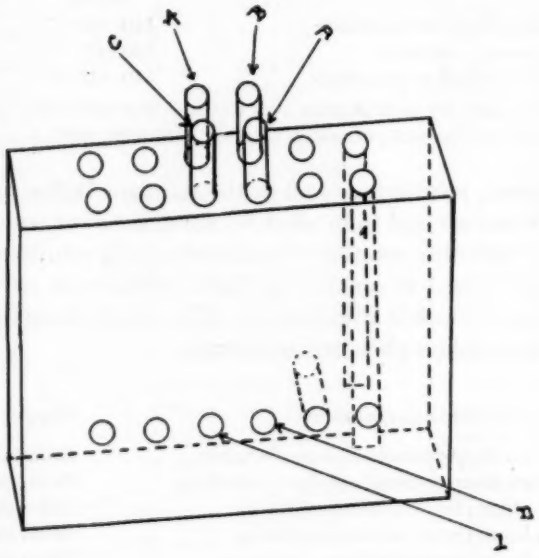


Fig. 1.—Flask on left. Fig. 2.—Block on right.

that each person may vary the amount of indicator used to suit the particular desire as to depth of color, etc. The writer preferred to use small test-tubes 0.7 cm. in diameter with 0.05 cm. wall and 8 cm. in length. These tubes have a volume of about 2.5 cc. and were graduated at 1 cc. Using 1 cc. in a tube of this type and using two drops indicator from a tube of small bore has given very good results with the conservation of a great deal of material and buffer solutions.

After adding the indicator the unknown solution is compared with several buffer solutions plus indicator, which have been taken in the same quantity as the unknown. The known p_H of the buffer solution which gives the same color as the unknown is taken as the expression of the p_H of the unknown.

Comparisons of color should be made under the same conditions for standard and unknown. Viewing the solutions by direct daylight is no doubt the best

method. Care must be taken to observe the depth of color as well as the shade obtained. As the limit in p_H range of an indicator is approached it is necessary to check the results obtained with other indicators to be sure that the correct p_H has been determined.

The p_H of cloudy or colored solutions may be determined using a block similar to the one illustrated in Fig. 2. Very good results have been obtained with solutions as dark as that given by iron cacodylate as well as with some "milky" solutions. One must be cautious to be sure that the determinations are correct, since in many cases with colored solutions the accuracy is not as great as with colorless solutions. Place a tube containing the unknown solution in the block (Fig. 2) in Position A; in Position B place a tube of distilled water; in Position D place a tube containing the unknown to which the indicator has been added, and C will represent the standard solution which will be changed until the color given matches that of Tube D when observed through holes l and n. When the color is matched the standard solution used in Tube C represents the p_H of the unknown.

The writer has used an aluminum block in which holes were bored of a size to hold the tubes loosely and deep enough to allow the curved bottom of the tubes to be below the lower side of the observation holes. These observation holes were bored in line with the holes for the tubes and just sufficiently smaller as to prevent looking at any time through the side walls of the tubes. Care should be taken that the salt concentration in unknown solutions is not misleading. It will be noticed in some cases that the shades produced are not at all comparable with the buffer solutions and may be accounted for by the fact that the salt concentration is not the same as in the standard buffer solutions, or that the solutions under examination contain a salt tending to destroy the indicator.

It is well to observe the depth or quality of the color produced; for example glucose solutions in some cases show the same shade as the standard buffers but do not seem to produce the same depth of color. Quinine dihydrochloride, quinine and urea hydrochloride and other quinine salts destroy the action of brom phenol blue entirely. Proteins as a class seem to have the greatest power for destroying the normal action of indicators. Pituitary extract is foremost among the gland extracts that destroy the indicator reactions, in fact it is not advisable to use the colorimetric method on concentrated extracts of any gland product.

It may be well to recommend an indicator suggested in Clark's "Determination of Hydrogen Ions," 2nd edition, composed of equal parts of methyl red indicator solution and brom thymol blue indicator solution and having a range of p_H 4.6 to 7.6. Experience will develop the technique and the ability to come very close in the p_H measurements. It is much better to use small tubes and to use freshly prepared color standards for comparison than to attempt to prepare a set of color standards for permanent use or even for only several days' use.

The following list of chemicals, will give an idea of how the p_H runs in C. P. chemicals purchased from various sources. There is a wide variation in some cases, the worst offender being C. P. sodium iodide.

Distilled water obtained from ordinary stills will range in p_H from 4.8 to 6.0, while stills carefully operated under the best conditions will produce water having a p_H of from 6.5 to 6.8 which is very good. Carbon dioxide is usually the principal

constituent that causes the low p_H in distilled water. The methyl red brom-thymol-blue indicator mentioned has given very good results with distilled water.

	p_H.	Indicator.
Caffeine	4.75–5.00–5.50–6.60	B. C. G.-B. T. B.-B. C. P.
Calcium chloride	7.45–7.90–8.10–8.90	P. R.-T. B.
Calcium glycerophosphate	8.20–8.30–8.35–8.40	P. R.-T. B.
Calcium lactate	6.85–7.00–7.50–7.90	P. R.
Dextrose	5.10–5.30–5.40–5.70	B. C. G.-B. C. P.
Hexamethylene-tetramine	7.70–8.00–8.20–8.40	P. R.-T. B.
Iron and ammonium citrate	3.10–3.50–4.00–4.60	B. P. B.-B. C. G.
Iron cacodylate	4.60–5.40–5.60–5.80	B. C. P.-B. C. G.
Magnesium sulphate	6.10–6.30–6.50–6.70	B. T. B. M. R. B. T. B.
Procaine	5.10–5.20–5.30–5.80	B. C. G.-B. T. B.
Potassium guaiacol sulphonate	7.45–7.60–7.70–7.90	P. R.
Sodium benzoate	7.70–8.20–8.50–9.30	P. R.-T. B.
Sodium cacodylate	7.85–8.00–8.30–8.45	P. R.-T. B.
Sodium citrate	7.70–8.00–8.30–8.40	P. R.-T. B.
Sodium glycerophosphate	8.60–8.70–8.90–9.00	T. B.
Sodium iodide	4.90–5.40–8.80–9.60	B. C. G.-T. B.
Sodium salicylate	6.90–7.05–7.10–7.40	P. R.-B. T. B.

For the p_H range 2.9 to 4.0 where bromo-phenol-blue has failed to give results dimethyl-amido-azobenzene has been used successfully. Under the title "A Universal Indicator for Hydrogen-Ion Concentration," Dr. Emil Bogen, in the *J. A. M. A.*, Vol. 89, 199, has suggested a mixture of phenolphthalein, 100 mg.; methyl red 200 mg; dimethyl-amino-azobenzene, 300 mg; brom-thymol-blue, 400 mg.; thymol blue 500 mg. Dissolve in 500 cc. of absolute alcohol and add tenth normal sodium hydroxide until the red disappears and the solution becomes yellow. This indicator will cover the p_H range from 1.0 to 10.0 and is very good to get the first estimate of the p_H; however the writer has found that economy may be had by using half the quantities of indicators and half the alcohol, and after solution adding water to make up the volume.

Samples of soils and similar materials may be soaked in a small amount of distilled water and the p_H determined on the filtered extract. The quantities taken are open to the workers' option and should be stated with the results.

Observation of the details that have been mentioned as to the preparation and storage of solutions along with a little experience and care will result in very satisfactory determinations. The determination of hydrogen-ion concentration has afforded the explanation and elimination of many troublesome and undesirable reactions in pharmaceutical products. There is at present a rapidly growing list of pharmaceuticals that are being held to a very definite acidity or alkalinity, and there can be no doubt that they deserve a preference.

ELI LILLY AND COMPANY, INDIANAPOLIS, INDIANA.

CARE OF ANIMALS FOR BIOLOGIC ASSAYS.

(*Concluded from p. 442, May* JOUR. A. PH. A.)

BY PAUL S. PITTENGER.

THE ALBINO RAT.

Feeding.—The albino rat thrives on almost any food utilized for human consumption. The more varied the diet the more vigorous the rats. The common

foods which have been found to be acceptable to rats include fresh and powdered milk, whole wheat, whole wheat flour, cracked corn, rolled oats, corn meal, hominy grits, dried peas and beans, egg powder, salt, practically all kinds of vegetables and fruits such as oranges, apples and pears.

The mixed "scratch feed" supplied by poultry dealers for chickens contains a variety of food substances such as wheat, oats, cracked corn, barley, kaffir, milo, buckwheat and sunflower seed upon which the rats thrive. "Poultry Growing Mash" is also a very satisfactory food for rats. The more common brands contain dried buttermilk, oatmeal, corn meal, ground oats, wheat middlings, wheat bran, meat scrap, bone meal and fish meal.

Although a variety of food seems preferable, a mixture of Whole Wheat Flour 2 pounds, Powdered Whole Milk 1 pound and Sodium Chloride $^1/_2$ ounce includes all the necessary elements for sustaining life. This mixture is satisfactory for normal growing and adult rats, lactating females and young pups. The animals remain thrifty, grow rapidly and can be fed indefinitely upon this mixture alone.

Breeders and others who maintain large colonies should use more varied diets. Complete instructions for the preparation of varied diets have been published by Greenman and Duhring.[1]

Water.—Fresh clean water should be available at all times. The rats will quickly foul water exposed in open vessels. Some breeders, therefore, supply water only in drinking fountains while others maintain that the rats keep themselves much cleaner and the odor is less marked in the colony house if the water is supplied in large open dishes in which the rats may bathe. If the latter method is used the water should be changed twice daily. The large open water container seems preferable in summer as the rats bathe frequently and apparently appreciate the cooling effect of the evaporation of the water from their bodies. This is demonstrated by the fact that the nursing mother will ofttimes quickly dip each of her pups in the water and carefully replace them in the nest. If the tops of the cages are made of wire screen the adult rats will ofttimes take a bath and then hang from the top of the cage by their teeth until dry. In extremely hot weather a small cake of ice placed in the water container is of value. The rats nibble off small pieces and seem to enjoy the procedure as heartily as all small boys enjoy taking small pieces from the neighborhood ice wagon.

During feeding experiments with known or unknown vitamines the water *must* be supplied in fountains. In such experiments only *distilled* water should be used and a few drops of tincture of iodine should be added to each litre to prevent the growth of bacteria, wild yeast, etc. Ordinary drinking water may contain extraneous mineral salts, bacteria, algae, wild yeasts and vitamines which may entirely upset the entire feeding experiment.

Handling.—"As in the case of other domesticated animals, it is not sufficient merely to feed and water albino rats and keep their cages clean."

"Individual attention, shown by handling and petting, is essential for the best growth of albino rats and for securing uniform reactions when used as research animals. They should have ample opportunity to know their caretakers.

[1] Greenman and Duhring, "The Albino Rat," 48–55.

Contentment soon replaces fear when they are placed in cages where they may receive some individual attention and where they may observe the various activities of the colony house, become accustomed to the noises of the place, and hear the voices of those engaged in the work of the colony. Under such conditions they eat and assimilate food in a more satisfactory manner. The absence of fear permits them to feed with pleasure and to digest food with none of the inhibiting influences of nervous tension which tend to restrain digestive secretions. Under such conditions, fertility is markedly increased."

"In handling rats, especially when they are unaccustomed to such treatment, one should approach the animals very slowly and quietly, making no quick or unexpected movements."

"Do not pick up a rat by its tail if this can be avoided."

"Grasp the rat gently about the body with its head towards the palm of your hand, closing the fingers under the abdomen, with the little finger under the rat's jaw. Any attempt of the rat to bite you may then be thwarted by closing your fingers firmly on its throat."

"Once held in your grasp for a moment or two, the rat will relax and very soon become quite contented in your hands. After such daily treatment for a brief period the rat will display no fear and will be quite satisfied to be handled. Albino rats are likely to exhibit greater fear when approached in the darker retreats of their cages. They seek shelter in such retreats and resent any attempt to remove them. The same animals may be approached with less risk of offense when they are out in open space." (Greenman and Duhring.)

Breeding.—If only occasional vitamine A assays are made it is preferable to buy the necessary animals from breeders who maintain large colonies. This is necessary in order to meet the U. S. P. requirements as to age and weight. Laboratories in which all kinds of vitamine and dietary deficiency experiments are conducted find it more satisfactory to breed their own animals in order that they may be certain as to the animals belonging to the same litter, the exact age of the animal, etc. For those who wish to breed their own animals the following information is of value:

The span of life is about three years.
The female mates when about eighty days of age.
The period of gestation is from twenty-one to twenty-three days.
The female may mate within two days after casting a litter.
One female may produce one hundred pups in a year.
Brothers and sisters may be mated with no unfavorable results.
The female usually ceases breeding when about 450 days of age.
Healthy females average seven to eight pups per litter.
One male may be caged with two or more females.
Heat or rut takes place every five days.

The male should not be removed from the cage when the female becomes pregnant or after the litter is born.

The nursing litter should be removed just before the succeeding litter is born.

Diseases.—The most common diseases of the ablino rat are pneumonia, middle-ear disease and various deficiency diseases.

The deficiency diseases may be cured by supplying the proper diet. The best remedy for the so-called pneumonia is hot cocoa administered every hour by means of a pipette.

Rats suffering with middle-ear disease usually carry the head turned slightly to one side. All such rats should be eliminated as they do not represent average normal rats and are, therefore, unsatisfactory for most research experiments.

Parasites.—Fleas and lice are the most common of the parasites which annoy rats. They should be treated the same as described under Cats.

ROOSTERS.

(Cockerels and Cocks.)

A *cockerel* is a male fowl less than *one* year old while the term *cock* is applied to a male fowl one year or more old.

There are many breeds of cocks only one of which (the White Leghorn) is official for Biologic Assay purposes.

The leghorns belong to the Mediterranean class which had their origin in countries bordering on the Mediterranean Sea. There are eight varieties of Leghorns, as follows: Single and Rose Comb White, Single and Rose Comb Brown, Single and Rose Comb Buff, Single Comb Black and the Silver.

The official cock for U. S. P. ergot assays is the *Single Comb White Leghorn*, less than eighteen months of age, and weighing approximately two Kg.

The Leghorns were originally imported by America from Italy.

Housing.—For *cocks kept indoors* the cages shown in Fig. 7 are very satisfactory both for housing stock fowl and for caging during the fasting and test periods. Two units of the cage, without the partition between are used for housing each five cocks. Two roosts are placed across the end of one of the units. This allows sufficient room for exercise between tests. In order to prepare for the fasting period all of the cocks are placed in the one unit and the partition inserted between it and the other unit. The tray is then removed, emptied, washed and about $^1/_4$ filled with clean sawdust. The partition is then withdrawn and the cocks driven into this unit. The partition is replaced while the tray of the other unit is emptied and the sawdust renewed. The partition is then removed. By this process the possibility of the cocks obtaining food from the bedding is entirely eliminated. During the fasting period the mash hoppers are closed. If only one or two of the cocks are to be injected at a time the partition is again inserted in order that those injected may be separated from the uninjected ones which greatly facilitates their removal for observation during the test period.

For *cocks kept outdoors* it is necessary to build some type of poultry house. The location and design of the poultry house and its construction determine in a large measure the condition of the cocks. A loose, dry, sandy, quickly draining soil is to be preferred. Avoid if possible heavy clays or land where rain water stands in puddles.

Bio-assayists, however, usually have practically no choice as to where they can keep their fowls. It is in most cases the college or factory yard. The principle condition, therefore, is the proper construction of the house. The essential requirements are comfort to the fowls and convenience for the attendant. It should be dry, cheerful, well ventilated, free from drafts, warm in winter, cool in summer, and easy to clean and keep in a sanitary condition.

Cocks have a relatively high body temperature (106° to 108°) and are, there-

fore, very sensitive to drafts. The best type of house for preventing drafts have the back and two ends closed with a properly constructed open-front. The open-front insures sunlight which in warm climates can be left open all the year and in cold climates the openings may be fitted with frames covered with burlap or unbleached muslin. This allows free passage of air but breaks up drafts.

The *floor* may be of concrete, cinders, earth or boards and should be a foot or more above the ground level to insure dryness. Dryness is one of the first essentials of a poultry house. Cold wet floors result in a very humid, unhealthy atmosphere. Cement floors should be covered with 4 to 8 inches of dry litter.

Sunlight is essential and it is important, therefore, that the house contain windows, preferably in the south side.

Eight to twelve square feet of floor space per bird should be allowed in small flocks and not less than four or five square feet per bird in larger flocks. Where birds are kept in cages in a large animal house the space per bird may be materially reduced.

Roosts.—About 50% of the cocks' time is spent roosting and it is, therefore, important that the roosts be properly constructed. Very often the mistake is made of constructing roosts of lumber 1″ by 1″ or 1″ by 2″. Roosts should be made of 2″ by 2″ or 2″ by 4″ material with the upper corners slightly rounded.

Feeding.—Cocks for ergot assays whether housed in cages indoors or kept in outdoor houses should be fed mixed scratch feed, growing mash with buttermilk, greens, charcoal and grit. These materials may be obtained from dealers in poultry supplies. The *growing mash* contains dried buttermilk, feeding oat meal, corn meal and ground oats, wheat middlings, wheat bran, meat scrap, bone meal, fish meal. The *scratch feed* contains wheat, oats, cracked corn, barley, kaffir, milo, buckwheat and sunflower seed.

The growing mash, charcoal and grit should be before the cocks at all times except during the starvation period immediately preceding each assay. These materials should be placed in 3-compartment *hoppers* constructed as shown in Fig. 8. Hoppers for outdoor houses should be provided with a drop lid which should be closed during the night. Open mash hoppers attract rats which will consume large quantities of mash.

The *function of the mash* is to supply proteins and fat in a form which is quickly and easily digested. When feeding dry mash always keep the supply of drinking water close to the mash hopper.

The *function of the scratch feed* is to supply carbohydrates. These supply body heat and induce the cocks to exercise. The scratch feed should be scattered in the litter so that the birds will exercise in searching for it.

Green food should be part of the daily diet of all caged or housed birds. Grass clippings, oat sprouts, celery tops, alfalfa, young wheat, clover, red beets, etc., are very acceptable.

Grit is a valuable aid to digestion. Cocks have no teeth and the grit is necessary in order that it may aid in grinding up the food in the gizzard. Charcoal has been found to be a valuable or perhaps necessary adjunct to the diet of fowls.

Feeding Methods.—The quantity of feed to be given depends largely upon the appetite and number of the flock. In the morning only sufficient scratch feed should be scattered in the litter to induce the birds to come down off the roost

and keep them busy for an hour or two. If fed too much in the morning they will sit around for many hours while the feed is slowly digested.

If greens are to be fed give about noon and open the mash hoppers so they may help themselves during the afternoon.

Late in the afternoon give sufficient scratch feed so that each cock will go to roost with a full crop. If a little grain remains in the litter, it will be scratched out early in the morning and keep the cocks busy until feeding time.

Moisture.—Although the house must be free from dampness a small percentage of moisture must be present or the birds will suffer from their legs becoming too dry. When they are kept in indoor cages, it is advisable, once a day, to slightly dampen the sawdust with water by means of a small sprinkling can such as used for watering flowers.

Beak and Nails.—As stated in the introduction, the beak and nails of caged birds will sometimes become so long and curved that it is difficult for them to walk or eat. It is necessary, therefore, at regular intervals to clip the beak and nails with bone clippers.

Water.—A supply of fresh water should be kept before the birds at all times. It should never be given in open dishes or hoppers. One of the commercial sanitary water containers should be employed. Open water dishes and hoppers are one of the greatest sources of spreading disease.

Sanitation.—If the cockerels are to be kept free from parasites and disease the most sanitary conditions must be maintained. Rational sanitary measures must be taken to prevent or delay the appearance of disease, to limit its spreading and to eradicate a disease which has already gained foothold. Cages should be cleaned at least semi-weekly. The trays should be scalded and washed with an antiseptic solution. The entire cage should be steamed or washed with an antiseptic solution at least once a month. Outdoor houses should be sprayed. Tray supports in cages and all cracks and crevices in houses should be sprinkled with a mixture of Sodium Fluoride 50% and Sodium Borate 50%.

Parasites.—Parasites by their irritation and blood sucking lower the vitality of the cocks and make them more susceptible to disease. The common external parasites which infest cockerels are *lice and mites*. Lice usually live, breed and have their complete cycle on the bird whereas mites usually originate elsewhere and go to the bird for feeding. When found dust the birds with a mixture of Talcum 60% and Sodium Fluoride 30%. Disinfect and if possible sterilize all cages or houses. The author has been able to entirely prevent infection by using cages as shown in Fig. 7 which are sterilized once a month with live steam applied by means of a hose.

Scaly Legs is a condition common in some localities so called because of the accumulation of scales or scabs upon the legs. This is a form of scabs caused by the parasite Sarcoptes mutans, variety gallinae. This condition should be treated by soaking the scabs with warm water and removing as many as possible by means of a small brush. Apply antiseptic solution. Caged birds if kept under proper conditions are seldom troubled with the internal parasites such as round worms, gizzard worms, gape worms and tape worms.

Diseases.—Cockerels are susceptible to the following diseases: The non-contagious diseases include obstruction of the beak, pip, sore mouth, diseases of the crop, limber neck and colitis. The contagious diseases include blackhead, fowl cholera, white diarrhea, tuberculosis, chicken-pox and roup.

In bio-assaying laboratories cocks are used only for ergot assays. The birds are, therefore, of little more value than their purchase price. It is usually more advisable, therefore, to discard afflicted animals than to try to cure them.

RESEARCH PHARMACOLOGIC LABORATORY,
SHARP & DOHME, BALTIMORE, MD.,
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ON THE PHYSICAL AND CHEMICAL PROPERTIES OF BISMUTH SODIUM CITRATE AND BISMUTH SODIUM TARTRATE.*

BY W. F. VON OETTINGEN, T. SOLLMANN AND H. H. SCHWEID.

The use of the water-soluble bismuth sodium citrate and bismuth sodium tartrate for intramuscular injections gives interest to the precipitation reactions of these salts by physiological salt solutions and serum, and to their diffusibility. These were investigated on five and ten per cent solutions of the dibismuthyl monosodium citrate and the bismuthyl bismutho sodium tartrate, described in previous papers (1, 2).

Effect of Hydrogen-Ion Concentration.—While the 10% solution of the bismuth sodium citrate is practically neutral, having a p_H of 7.2 to 7.4, the bismuth sodium tartrate solution of the same concentration is decidedly alkaline, the p_H being 8.2 to 8.4. This alkalinity is probably due to the bismutho group which has basic qualities, as indicated by its tendency to form salts with a number of alkali salts of strong mineral acids. The effects of alteration of the p_H, produced by the addition of $N/10$ HCl or NaOH, also reveal a striking difference between the two preparations, as shown in Table I:

TABLE I.—THE EFFECTS OF p_H ON THE BISMUTH SOLUTIONS.

p_H of solution.	Precipitant effect on 5 per cent of Bi Na citrate.	Precipitant effect on 5 per cent solution of Bi Na tartrate.
9.8	+++	0
8.2	+	0
7.9	0	0
7.6	0	+
7.0	0	++
6.4	+	++
6.0	++	+++
5.4	++	+++
5.0	++	+++

The citrate remains in solution through the whole range of the physiological p_H, between 7.9 and 7 0, but is precipitated beyond this range, by alkali as well as by acid. The tartrate, on the other hand, is not precipitated by alkali as high as p_H 9.8, but is precipitated by decrease of the alkalinity within the physiological range, at 7.6. This precipitation of the tartrate occurs also when changes of the p_H at the same range are produced by the addition of adequate amounts of acetic acid, so that the precipitation is due to the change of the hydrogen-ion concentration, and not to the chloride ion; for the acetates in the physiological range have no precipitant action on bismuth sodium tartrate in aqueous solutions.

Effects of Physiologically Important Cathions and Anions.—In the following experiments the physiologic salts were added to 15 cc. of 10% solution of the two bismuth compounds in quantities that would occur in the serum and in physiological salt solutions; other salts were added in isomolecular ratio.

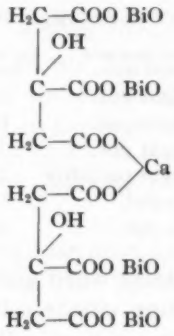
Table II shows that only the calcium salt precipitates the bismuth sodium citrate. The precipitate contained 64.2 per cent of bismuth and 3.4 per cent of calcium,

* From the Department of Pharmacology of the School of Medicine of Western Reserve University, Cleveland, Ohio.

TABLE II.—THE EFFECTS OF PHYSIOLOGIC CATHIONS AND ANIONS ON THE BISMUTH SOLUTIONS.

Concentration of salt in per cent.	Dibismuthyl monosodium citrate.	Bismuthyl bismutho monosodium tartrate.
0.92 NaCl	No precipitate	Precipitate
0.042 KCl	No precipitate	Slight precipitate
0.024 $CaCl_2.2H_2O$	White precipitate (partly redissolved)	Precipitate
0.03 $NaHCO_3$	No precipitate	No precipitate
2.16 NaBr	No precipitate	Precipitate
2.32 NaI	No precipitate	Precipitate
1.32 $NaNO_3$	No precipitate	Slight precipitate
2.14 Na acetate	No precipitate	No precipitate
1.17 KCl	No precipitate	Precipitate
1.59 KNO_3	No precipitate	Slight precipitate
2.17 K_2CO_3	No precipitate	No precipitate

corresponding closely to the 63.8 per cent of Bi and 3.0 per cent of calcium required for tetrabismuthyl monocalcium dicitrate.



This precipitation can be prevented by the addition of sodium citrate; 0.2 to 0.4 Gm. or more of sodium citrate added to 10 cc. of the bismuth sodium citrate solution prevent immediate precipitation by 2 cc. of 10 per cent calcium chloride solution. Partial precipitation occurred on standing for fourteen hours, the amount of the precipitate decreasing with the quantity of the citrate.

Since the inhibiting action of sodium citrate on the precipitation of bismuth sodium citrate by calcium salts is probably due to reduction of the ionization of calcium, the effect of changes of the hydrogen-ion concentration was studied as these may be expected to act in the same direction. Mixtures of 5 cc. of 5 per cent bismuth sodium citrate were adjusted by the addition of $N/10$ NaOH or HCl to various levels of p_H between 8.0 and 6.5, the range in which the bismuth sodium citrate is soluble; and 2 cc. of 10 per cent calcium chloride solution were added. It was found that the calcium precipitated through this entire range, but the quantity of the precipitate increased with the hydrogen-ion concentration, *i. e.*, inverse of the p_H; corresponding to the increased ionization of the calcium salts in the more acid medium. This supports the assumption that the addition of sodium citrate interferes with the precipitation of bismuth sodium citrate by reducing the ionization of the calcium salt.

Bismuth sodium tartrate, as shown in Table II, is precipitated not only by calcium chloride, but also by sodium or potassium chloride, bromide, iodide and somewhat less by nitrate. This is probably due to the reactivity of the bismutho

group, *i. e.*, the BiO group connected with the hydroxyl group of the tartaric acid radicle. The acetate, bicarbonate and carbonate ions are not precipitant, nor are the sodium and potassium ions.

Effects of Locke Solution.—These were studied for the ordinary Locke solution, containing per cent: 0.9 NaCl; 0.042 KCl; 0.024 $CaCl_2.2H_2O$; and 0.03 $NaHCO_3$. The experiments were made by adding 1, 2, 3, 4 and 5 cc. of this solution to 5 cc. of 5 per cent solution of bismuth sodium citrate and bismuth sodium tartrate. The Locke solution was found to precipitate the bismuth sodium tartrate through its p_H and through its calcium and chloride ions. The sodium bismuth citrate is not precipitated by the Locke solution, for even the calcium chloride is non-precipitant in these dilutions.

Effects of Serum.—These were tried by mixing 5 cc. of cattle serum with increasing quantities of a 10 per cent solution of bismuth sodium citrate and bismuth sodium tartrate. Table III shows that bismuth sodium citrate gives slight

TABLE III.—THE EFFECT OF SERUM ON THE BISMUTH SOLUTIONS.

Cc. of cattle serum.	Cc. of Bi Na citrate.	Immediate effect.	Effect fourteen hours later.	Cc. of Bi Na tartrate.	Immediate effect.	Effect fourteen hours later.
5	0.25	Slight turbidity	Slight ppt.	0.25	Strong turbidity	Ppt.
5	0.5	Slight turbidity	Slight ppt.	0.5	Ppt.	More ppt.
5	1.0	Slight turbidity	Slight ppt.	1.0	Ppt.	Strong ppt.
5	2.0	No ppt.	Slight turbidity	2.0	Ppt.	Strong ppt.
5	3.0	No ppt.	No ppt.	3.0	Ppt.	Strong ppt.
5	4.0	No ppt.	No ppt.	4.0	Strong turbidity	Strong ppt.

turbidity and later slight precipitates when added in small quantities to serum. Higher ratio of the bismuth sodium citrate solution prevents the precipitation, presumably by diluting the calcium content. With the bismuth sodium tartrate the precipitation is distinctly greater, corresponding to the precipitant action of the p_H and calcium and chloride ions. That the precipitation is not due to protein may be seen from the fact that both preparations form only a slight turbidity with 10 per cent egg-albumen solution. The precipitation of these bismuth compounds by serum suggests that the immediate toxic effects of intravenous injections are due to flocculation rather than to the toxic action of the bismuth radicle.

The Relative Diffusibility of Bismuth Sodium Citrate and Bismuth Sodium Tartrate.—This was tried with collodion sacs in the presence of egg-albumen, so as to approach more closely to the conditions in the tissues. The sacs were filled with 8 cc. of a mixture of 5 cc. of a 10 per cent solution of the bismuth compounds and 20 cc. of a 10 per cent egg-albumen solution. Each sac was then placed in 91 cc. of distilled water for forty-eight hours, and the bismuth content of the inner and outer solution was determined as bismuth sulphide, after the destruction of the organic matter by digestion with sulphuric acid and hydrogen peroxide. The dialysates contained on the average 21.8 per cent of the bismuth in the case of the citrate, and 32.8 per cent for the tartrate. Three series of experiments with each, agreed closely in the average values, but the difference between the two salts is not considered significant.

Effects of Boiling.—While a bismuth sodium citrate solution can be boiled for five to ten minutes without acquiring more than a slight opalescence, bismuth sodium tartrate forms a more or less abundant precipitate under the same con-

ditions, so that the latter cannot be sterilized by heat. As phenol and tricresol do not precipitate either compound, solutions of bismuth sodium citrate and of bismuth sodium tartrate can be rendered sterile by the addition of 0.4 per cent tricresol. For intramuscular injections this is advisable, since neither preparation is in itself antiseptic.

CONCLUSIONS.

Ten per cent solutions of bismuth sodium citrate are practically neutral, the p_H being 7.2 to 7.4; 10 per cent solutions of bismuth sodium tartrate are distinctly alkaline, having a p_H of 8.2 to 8.4. Changes of the p_H within physiological limits, *i. e.*, from 7.0 to 7.9, do not precipitate the bismuth sodium citrate, while the precipitation of the bismuth sodium tartrate begins at a p_H of 7.6 and increases with increasing acidity.

Bismuth sodium citrate is precipitated by calcium chloride, while the tartrate precipitates with a great number of alkali salts of strong mineral acids, including chlorides.

The precipitation of bismuth sodium citrate by calcium chloride can be prevented by the addition of sodium citrate, which tends to reduce the ionization of the calcium chloride. Changes of the p_H within physiological limits of the solution in the alkaline direction act in the same way.

The addition of Locke solution to 5 per cent solutions of the bismuth sodium tartrate produces precipitation; 5 per cent bismuth sodium citrate solution is not precipitated.

The preparations do not precipitate proteins. The citrate may form a slight precipitate with the calcium of serum; the bismuth sodium tartrate is precipitated also by the other mineral salts.

The diffusibility of the citrate and of the tartrate is about the same, that of the latter being somewhat greater.

Aqueous solutions of bismuth sodium citrate can be sterilized by boiling, whereas the tartrate is precipitated by heat. Both solutions can be rendered sterile by the addition of 0.4 per cent tricresol.

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CUBIC DECIMETERS AND LITER DEFINED.

The new or redefined unit of volume, which by definition was made equal to the volume of a kilogram of pure water at the temperature of its maximum density, was given the same name as that formerly applied to the cube of the tenth of the meter; that is, it was called the liter, although by the new definition it had no direct relation to the unit of length.

As a result of the redefining of the liter in terms of the unit of mass, we now have two distinct units of volume, the cubic decimeter defined in terms of the meter, and the liter defined in terms of the kilogram.

The cubic decimeter and its one-thousandth part, the cubic centimeter, are used in measurements of volume derived from measurements of length, while the liter and its one-thousandth part, the milliliter, are used in measurements of volume and density of liquids based on determinations of mass.

POLYMERIZATION OF OLEFINES.*

BY R. VAN WINKLE.

Within the past few years considerable work has been accomplished in studying the pharmacological action of the lower members of the hydrocarbons of the ethylene series. Propylene, the second member of this series, has offered great possibilities as a new and valuable anæsthetic. In the use of the latter, as an anæsthetic, certain undesired results have been observed which are attributed to impurities present in small amounts. It is thought that higher members of the ethylene series of hydrocarbons (*i. e.*, isobutylene, *n*-butylene, etc.) comprise these impurities. The ethylene hydrocarbons are prepared by the dehydration of the corresponding alcohols, and in the case of propylene, the isopropyl alcohol used had been obtained in the highest possible state of purity known to modern chemistry without producing the desired results. Accordingly it resolved into a problem of removing the impurities from the final product, propylene, and it is in connection with the latter that the following work has been carried on.

Gurwitsch in his studies on adsorption found that amylene and pinene were rapidly polymerized by gently heated Floridin, a commercial silicate, used in decolorizing oil products. Lebedew and Filanenko, two Russian chemists, next took up the study and investigated quite thoroughly the field of polymerization by the above substance. They experimented with numerous unsaturated hydrocarbons but especially with those of the ethylene series and as a result set forth the following generalizations:

1. Of the ethylene compounds only those polymerize in presence of activated Floridin which are derivatives of asymmetrical doubly or triply substituted ethylenes ($RR'C{=}CH_2$, $RR'C{=}CHR''$).

2. Simply substituted ethylenes and symmetrical doubly and triply substituted compounds do not polymerize.

3. The above rules apply also to diethylenes.

From these generalizations we are led to believe that propylene, a simply substituted ethylene, will not be polymerized by activated Floridin while an asymmetrical doubly substituted ethylene, like isobutylene, will readily tend towards polymerization. By the use of activated Floridin a method suggested itself for the removal of some of the impurities from propylene.

EXPERIMENTAL WORK.

As a matter of courtesy we wish to state that the literature work as well as the preliminary experiments were carried out by other members of the laboratory prior to our taking over this particular phase of the problem.

PROPYLENE.

The activated Floridin used was prepared by heating the commercial Floridin at a fairly high temperature over a period of time as suggested by Lebedew. The propylene was manufactured by a catalytic process of alcohol dehydration and two pounds of the latter with one pound of activated Floridin were stored in suitable cylinders for observation purposes. At the end of two months several

* Scientific Section, A. PH. A., St. Louis meeting, 1927.

of these cylinders were opened and the Floridin examined. The latter was found to be saturated with a liquid and in some cases even a small amount of free liquid could be decanted off. The amount of polymers formed was far in excess of that which might be formed from the small amount of impurities known to be present. It was thought at the time that a combination of one molecule of propylene with one molecule of a higher member of the series of ethylene hydrocarbons might have taken place or else the propylene might have polymerized itself. The latter, however, was not in accord with Lebedew's generalization as previously stated. A distillation under normal pressure showed a portion of the liquid boiling around 70° C., another portion around 100° C. and a higher boiling residue remaining. According to Mulliken, substances of the empirical formula $(C_3H_6)_2$ the same as a dimer of propylene, have the following boiling points:

Dimethyl ethyl ethylene	66° C.	Methyl ethyl propylene	69.5–71° C.
S methyl propyl ethylene	68° C.	Tetra methyl ethylene	73° C.
Butyl ethylene	69° C.		

Likewise substances of an empirical formula $(C_3H_6)_3$, the same as a trimer of propylene, boil around 100° C. From the above we were fairly sure that we were dealing with polymers of propylene. No further work was done until a year following the beginning of the experiment. At this time some more cylinders were opened and it was noticed that each contained several hundred cubic centimeters of polymer mixture. A portion of this when subjected to distillation at normal pressure yielded no distillate around 70° C., and only a small portion coming over between 100° C. and 150° C. A liter of the polymers was obtained by extracting the Floridin in several cylinders with petroleum ether and distilling off the latter at a low temperature. The resulting polymer mixture was put through a process of repeated fractional distillation under diminished pressure with the following results.

Fraction I	15%	Boiling range	35.5–37.5° C./7 mm.
Fraction II	30%	Boiling range	60–64.5° C./7 mm.
Fraction III	15%	Boiling range	82–85° C./3 mm.
Residue	40%	Higher boiling polymers	

As a means of identification of the various fractions our intention was to form the di-brom derivatives on the assumption that each molecule contained but one double bond. We met with difficulty here, in that in every case substitution of bromine occurred long before addition of the same substance could possibly be complete. It was next decided to determine the molecular weight of the fractions by determining the lowering of the freezing point of pure benzene. The latter was obtained by low-temperature crystallization from chemically pure benzene. The molecular freezing point depression constant for benzene was taken, as given by Landolt Börnstein, as 51.2.

Molecular Weight of Fraction I.

Wt. of benzene	9.5814 Gm.
Wt. of polymer	0.1932 Gm.
Freezing point lowering	0.77° C.
Mol. weight determined	134
Mol. weight calculated for a trimer of propylene	126

Molecular Weight of Fraction II.

Wt. of benzene	7.0447 Gm.
Wt. of polymer	0.2420 Gm.
Freezing point lowering	1.03° C.
Mol. weight determined	171
Mol. weight calculated for a tetramer of propylene	168

Molecular Weight of Fraction III.

Wt. of benzene	9.0534 Gm.
Wt. of polymer	0.3417 Gm.
Freezing point lowering	0.89° C.
Mol. weight determined	214
Mol. weight calculated for a pentamer of propylene	210

Mean Molecular Weight of Residue.

Wt. of benzene	9.1402 Gm.
Wt. of residue	0.3581 Gm.
Freezing point lowering	0.61° C.
Mol. weight determined	328

This corresponds closely to the molecular weight of an octamer of propylene (336) and would indicate that the residue is composed of several polymers of propylene higher than a pentamer.

Note.—Control cylinders run at the same time containing propylene but no activated Floridin showed no polymer or liquid formation over a year's period.

ISOBUTYLENE.

In his work on isobutylene, Lebedew states that polymerization of the latter with activated Floridin takes place very readily. His experiment was repeated in our laboratory and by distillation at normal pressure of the polymer mixture formed it was indicated that a dimer, trimer and higher polymers were present. In this work a very short column of activated Floridin (five inches) had been used. It was decided to prepare the polymers on a larger scale and in so doing we used a twenty-four-inch column of the Floridin. Our isobutylene was prepared from tertiary butyl alcohol and before passing into the well-cooled Floridin tower it was washed free from any unchanged alcohol and then dried. The receiving flask for the isobutylene polymers was kept well chilled to prevent any loss of the lower boiling members due to volatilization. In carrying out the experiment we found that a slight pressure developed in the system would tend to increase the rate of reaction. Several liters of isobutylene polymers were obtained and a portion subjected to repeated fractional distillation in vacuo with the following results:

Fraction I	62.5%	Boiling range	43–46° C./7 mm.
Fraction II	13.3%	Boiling range	75–79° C./5 mm.
Residue	24.2%	Higher boiling polymers	

The molecular weights of these fractions were determined as described under propylene.

Molecular Weight of Fraction I.

Wt. of benzene	5.9512 Gm.
Wt. of polymer	0.2142 Gm.
Freezing point lowering	1.12° C.
Mol. weight determined	164
Mol. weight calculated for a trimer of isobutylene	168

Molecular Weight of Fraction II.

Wt. of benzene	8.3184 Gm.
Wt. of polymer	0.2110 Gm.
Freezing point lowering	0.585° C.
Mol. weight determined	222
Mol. weight calculated for tetramer of isobutylene	224

Mean Molecular Weight of Residue.

Wt. of benzene	9.4859 Gm.
Wt. of residue	0.2985 Gm.
Freezing point lowering	0.49° C.
Mol. weight determined	328

The molecular weight of a hexamer of isobutylene is 336 and accordingly the residue must contain several polymers of isobutylene higher than a tetramer.

CONCLUSIONS.

1.—It has been shown that although propylene is stated by Lebedew not to polymerize in the presence of activated Floridin, it does polymerize in the presence of the latter if kept under pressure.

2.—The factors influencing the polymerization of olefines by activated Floridin are:

(*a*) *Temperature.*—Inasmuch as the reaction is exothermic and a large amount of heat is liberated, proper cooling of the activated Floridin is essential for best results.

(*b*) *Pressure.*—Pressure was essential to polymerize a simply substituted ethylene, namely propylene, and in the case of isobutylene, an asymmetrical doubly substituted ethylene, which polymerizes readily at ordinary pressure, the polymerization reaction is increased if the system is put under pressure.

(*c*) *Time of Contact with Activated Floridin.*—Propylene under pressure with activated Floridin for two months had formed some dimer while at the end of year no dimer was present. Isobutylene when passed through a short column of activated Floridin formed some dimer but when the length of the column was materially increased only higher polymers were found.

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A DISCUSSION OF THE PHARMACOPŒIAL SPECIFICATIONS FOR CRESOL.*

BY HUBERT OHAVER.

After the publication of the U. S. P. X a certain agitation was manifested to have either the present specifications for U. S. P. Cresol changed or else to have a new high boiling Cresylic Acid incorporated into the book in addition to the present Cresol. The discussion was opened by manufacturers of saponified cresol solutions from cresylic acids of higher boiling range than that outlined in the U. S. P. Their principal arguments for the change are four in number, namely: (1) Cresylic Acids of higher boiling range than 195–205° C. possess greater germicidal values than U. S. P. Cresol, (2) they are less corrosive to tissues, (3) they are cheaper and (4) there is a greater available supply of them on the market. Certainly, if true, these are a very valid set of arguments. Since Solution Cresol Compound, U. S. P. now enjoys quite an extensive use as a germicide by members of the medical profession especially, the question of a change in its specifications will no doubt have to be considered before the publication of the next U. S. P. A large number of saponified cresol solutions purporting to be U. S. P. products but which do not contain Cresol corresponding to the specifications of the U. S. P. X have appeared on the market. In order to maintain the dignity of the U. S. P. as a legal standard it becomes necessary to have any solutions erroneously labeled as U. S. P. removed from the market or else to have the U. S. P. specifications changed to include them. It has not been the policy of U. S. P. revision com-

* Scientific Section, A. PH. A., St. Louis meeting, 1927.

mittees of the past to change the text of the book to conform with the whims of any certain group of manufacturers. Few of us would want to see any such policy adopted by future committees yet all, no doubt, want to see future Pharmacopœias reach the highest state of excellence possible, and any genuine improvement of the book should be more than welcome. It is with a discussion, in a general way, of the advisability of changing the present specifications of Cresol that this paper is concerned. The writer is engaged in laboratory manufacturing both Compound Solution of Cresol, U. S. P. and a similar solution of higher boiling acids under its own trade name, and it has been his privilege during the past two years to investigate many different types of cresylic acid in addition to U. S. P. cresols and supposed-to-be U. S. P. cresols on the market.

The first of the arguments for a change of Cresol specifications seems to be the strongest. That is the argument that the high boiling acids produce a solution of greater germicidal efficacy than the present Cresol. The contention is, if high boiling acids produce a solution that is more efficient as a germicide, why not use high boiling acids? And if true, and our present methods of determining germicidal values indicate that it is, this is an excellent argument. Some members of the Fungicide Department of the Bureau of Chemistry submitted a report to the Pharmacopœial Revision Committee in which they showed this to be the case with the two organisms *B. typhosis* and *Staph. aureus*. Whether this is the case with all organisms is not known. But since high boiling cresols give a higher phenol coefficient by the methods for determining phenol coefficients in general use, it seems very probable that they are more efficient as disinfectants.

The second argument, that the higher boiling cresols are less corrosive to tissues, has not been definitely proven to the writer's knowledge. It is a generally accepted fact that the ortho, meta and para cresols are less corrosive than ordinary benzo phenol. Whether or not the higher boiling cresols, xylenols, etc. are still less corrosive the writer is not in a position to state. But it really makes no practical difference since the very fact of the general acceptance of Compound Solution Cresol, U. S. P. speaks highly of it as an efficient and harmless disinfectant.

At present there can be no doubt of the validity of the third argument—that of price. The acid specified by the U. S. P. sells quite a bit higher than a good grade acid of any other boiling range.

Authorities seem to disagree on the fourth argument. There is perhaps more or less of a shortage of U. S. P. Cresol but any laboratory that can anticipate its needs for a short time in the future, experiences no difficulty in obtaining a sufficient stock. It is doubtful if an actual shortage of U. S. P. Cresol exists.

The U. S. P. at present defines Cresol as a mixture of the three isomeric cresols, having a specific gravity of about 1.038 and ninety per cent of which distills between the ranges of 195 and 205 degrees C. This specification of boiling range was made in consideration of the boiling points of ortho, meta and para cresol, which are about 190.8, 202.8 and 201.8 degrees, respectively. Having to meet certain solubility tests, specific gravity and narrow boiling range, U. S. P. Cresol as now defined becomes a fairly uniform product. "High boiling" cresylic acids on the market might be defined for our purpose to be any cresylic acid less than ninety per cent of which will have come over by the time a temperature of 205° C. has been reached. They are not defined legally except as to classification into

dutiable and duty-free products and are not liquids of uniform composition. They vary in boiling range, color, odor and solubility in soap solutions according to their method of manufacture. Phenol coefficients of their saponified solutions also vary. The variations of solubility, color and phenol coefficient are the ones most troublesome to a manufacturer of a saponified cresol solution. The solubility of a cresylic acid is no doubt in correlation with its boiling range but in the daily routine examination of the products of different manufacturers one finds many examples of acids of comparatively low boiling range making a solution inferior to that of a higher boiling acid. The following actual figures from the author's laboratory note book illustrate this point.

DISTILLATION RANGE—100-CC. SAMPLES.

No. 1.		No. 2.	
to 190° C. (corr.)	1 cc.	to 190° C. (corr.)	0 cc.
195°	1 cc.	195°	0 cc.
207°	5 cc.	207°	1 cc.
215°	68 cc.	215°	41 cc.
230°	98 cc.	230°	95 cc.

No. 1 would not make a clear saponified solution, No. 2 made a beautiful one. No. 2 was found by assay to contain ninety-nine per cent of phenols. This sort of solubility result is not at all uncommon. The writer regrets that since the routine examination of a cresylic acid is begun by actually making a saponified solution from it and, if this proves unsatisfactory, discarding the acid without further tests, except in special cases, he has more statistical data on cresylic acids that will make satisfactory solutions than on those that will not. But it is true to state that the solubility of a cresylic acid is influenced by other factors in addition to its actual boiling range. There are many different kinds of cresylic solutions on the market all known as "High Boiling Acids" and varying through wide ranges in physical properties.

This lack of uniformity of high boiling cresylic acids should be fully realized before attempting to make any change in the present pharmacopœial specifications for cresol. There are two possibilities for a change, namely: (1) official recognition of cresylic acids of varying and ununiform compositions, in which case the recognition would be more or less meaningless or (2) adoption of a new set of definite specifications for a different but still uniform acid. Since the main reason for the existence of the U. S. P. is to establish a standard of uniformity of medicinal products, it would seem that the latter type of change is the only justifiable one to be made. If a new uniform cresylic acid is adopted it will, if its compound solution meets with general approval and use, soon meet with economic conditions very similar to that encountered by the present Cresol. But the fact will still remain that it gives a higher phenol coefficient than the present Solution of Cresol Compound, U. S. P. Will it be wise to change from the present Solution, a solution that has met with extensive use and one with which the members of the medical profession are already familiar, for the sake of a difference in the phenol coefficient of the new product? If so, we should welcome the change, if not we should retain the present Cresol. In either case, in order to maintain the U. S. P. as a Standard and as *the* standard, strict conformity to its specifications should be enforced.—LABORATORY OF PARKE, DAVIS & CO., DETROIT, MICH.

FACTS REGARDING THE MANUFACTURE, PHYSICAL CONSTANTS AND KEEPING QUALITIES OF SOAP, CHLOROFORM AND CAMPHOR LINIMENTS OF THE U. S. P. X.*

BY SAMUEL SHKOLNIK.

Last year, at the Philadelphia meeting of the A. PH. A., L. E. Warren of the Drug Research Unit of the Bureau of Chemistry of the U. S. Department of Agriculture intimated that he would like to gather some definite data regarding such physical constants as optical rotation, and specific gravity and the per cent of solids of soap and chloroform liniments. It was the request of Mr. Warren, therefore, supported by the advice of Prof. Clyde M. Snow of the University of Illinois School of Pharmacy that prompted my undertaking of the compilation of the data on the two above-named liniments. Before presenting the compiled data, however, I shall briefly discuss the ingredients and manipulations in the manufacture of Soap Liniment.

The formula for Soap Liniment as given in the U. S. P. X (and as had been given in the U. S. P. IX) and the directions for its manufacture are to dissolve 45% of camphor and 1% of oil of rosemary in 70% of alcohol and then add 5% of soap and enough water to make 100%. This is to be agitated until the soap dissolves, after which time the solution is to be set aside in a cool place for twenty-four hours and then filtered. We understand, of course, that the soap used in this liniment is the official "castile soap" made by the reaction between olive oil and sodium hydroxide. Since palmitin is a constituent of olive oil there is in the finished soap more or less sodium palmitate which is less soluble in cold alcohol than in warm and, to avoid precipitation in cold weather, the preparation should be kept cold for twenty-four hours and then filtered; otherwise the sodium palmitate, being in a finely divided condition, would pass through the filter paper and consequently would later precipitate on standing. Both the duration of time and the proper temperature must be observed if satisfactory results are to be obtained in determining the per cent of solids and specific gravity.

It may be pointed out at this time that the setting aside of the liniment for twenty-four hours in a "cool place" must not be interpreted as meaning a place like an ice box or any other refrigerator, for in such cases the preparation will congeal into a jelly-like, somewhat opaque mass necessitating a subsequent "thawing out" or warming before filtering. Such procedure would only cause unnecessary delay; for on warming, the sodium palmitate dissolves and a subsequent cooling is required before it could be removed.

Comparing the ingredients and the manner of preparation as outlined in the U. S. P. with those outlined in the British Pharmacopœia we find that the British formula calls for soft soap which is made from potassium hydroxide and olive oil (unlike the soft soap of the U. S. P. X, which is made from linseed oil and sodium and potassium hydroxide). Since the soft soap according to the British formula contains no sodium palmitate separation will not occur, even in cold weather, for potassium soap is soluble in alcohol, cold or warm, hence the British Pharmacopœia does not require cooling the liniment before filtering.

* Section on Practical Pharmacy and Dispensing, St. Louis meeting, 1927.

Another peculiarity must be pointed out at this time which may affect the specific gravity and per cent of solids in the case of "Chloroform Liniment" which is prepared by agitating 30% of chloroform with 70% of soap liniment. The peculiarity in this case is that while soap liniment, as such, will show precipitation on standing in the cold, if the sodium palmitate had not been removed by twenty-four hours of cooling followed by filtration, my observations show that "Chloroform Liniment" will not precipitate on standing in the cold even though it had been prepared from soap liniment, the sodium palmitate of which had not been removed by cooling and filtering. This indicates then that the "would be precipitated" sodium palmitate is dissolved by the chloroform used in the manufacture of chloroform liniment, hence, a perfectly clear chloroform liniment might contain some of the "would be precipitated" sodium palmitate if it were prepared from a soap liniment which had not sufficiently cooled for twenty-four hours before filtering and in such case the per cent of solids is appreciably higher although the difference in specific gravity is negligible.

Having thus discussed the various factors which may affect the results I shall now outline the methods employed and results obtained.

METHODS.

The methods employed as suggested by Mr. Warren are as follows:

(*1*) *Specific Gravity.*—This was determined at 25/25° C. by means of a pycnometer.

(*2*) *Optical Rotatory Power.*—This was determined at 20° C. by the use of both 100-mm. and 200-mm. tubes and the findings reported in angular degrees. If the material be too dark for direct reading it will clear up considerably by diluting it with one of three volumes of alcohol at 20° C. and report findings accordingly.

(*3*) *Per Cent of Solids.*—This was determined by placing 1 Gm. of sand and a stirring rod in a beaker of about 150-cc. capacity and drying at 100° C. to constant weight. To this 10 cc. of the liniment in question was added by means of a pipette. The mixture was then evaporated on a steam-bath with occasional stirring until the odor of camphor had disappeared. The residue was then dried in an oven at 110° to constant weight.

RESULTS.

Linimentum Saponis—U. S. P. X.

1. *Specific Gravity.*—0.876 at 25° C. (average of 3 trials).
2. *Optical Rotatory Power.*—(*a*) Using a 100-mm. tube (average of 7 trials) +1.51° Dextrorotatory. (*b*) Using a 200-mm. tube (average of 5 trials) +3.34° Dextrorotatory.
3. *Per Cent of Solids.*—5.955 Gm. in 100 cc. (average of 3 trials).

Linimentum Chloroformi—U. S. P. X.

1. *Specific Gravity.*—1.060 at 25° C. (average of 3 trials).
2. *Optical Rotatory Power.*—(*a*) Using 100-mm. tube (average of 7 trials) +1.23° Dextrorotatory. (*b*) Using 200-mm. tube (average of 5 trials) +2.30° Dextrorotatory.

3. Solids on Drying.—4.155 Gm. in 100 cc. (average of 3 trials).

The above determinations were made in November 1926, and a copy of same was forwarded to Mr. Warren; since then, on his suggestion, I kept divided portions under different conditions of storage (such as flint and amber-colored bottles, filled and partially filled bottles, exposure to sunlight and in a dark closet) until August 1927, when I undertook to determine what effect, if any, the different conditions of storage had on the two liniments. The results were so much similar to those obtained in November that to outline them would be repeating the first results with slight variations which are negligible. It is interesting to note that even in the case of chloroform liniment—a preparation with such a highly volatile constituent—where a variation in the results was expected no appreciable difference was observed. The paper of J. W. E. Harrisson from the laboratory of Charles H. LaWall of Philadelphia, read before the Section on Practical Pharmacy and Dispensing at the Cleveland meeting of the A. PH. A. in 1922 or 1923, contains similar results in regards to the stability of chloroform liniment kept for three months in glass or cork-stoppered containers. I may say that it was this information that led me to investigate the effects of keeping under different conditions of storage on **Linimentum Camphoræ** which will be next considered.

Early in the fall of 1926 an article appeared in a "health column" of one of Chicago's daily newspapers in which it was stated that "Camphorated Oil" will lose its strength, decompose or deteriorate, even if kept under the most suitable conditions of storage. Prof. Wm. B. Day, dean of the University of Illinois School of Pharmacy called my attention to this article which, in view of the report of Mr. Harrisson (to the effect that "Chloroform Liniment" was fairly stable under different conditions of storage) sounded very unlikely. I, therefore, undertook to determine whether the article in the "health column" is correct and, in December 1926, I prepared a sample of camphorated oil in accordance with the U. S. P. X and determined the specific gravity at 25/25° C. by the use of a pycnometer and the per cent of camphor following the assay process as outlined in the U. S. P. X, which consists of heating a definite weight of camphorated oil in a tared porcelain dish at about 110° C. for 90 minutes (or until the odor of camphor has disappeared) and cooling and weighing; thus ascertaining the loss of camphor. I also kept portions of this liniment until August 1927, under different conditions of storage and tested again.

RESULTS.

Linimentum Camphoræ—U. S. P. X.

December 1926.

1. Specific Gravity.—0.939 at 25° C. (average of 2 trials).
Per Cent of Camphor.—19.964% (average of 3 trials).

August 1927.

2. Specific Gravity.—0.938 at 25° C. (average of 2trials).
Per Cent of Camphor.—19.959% (average of 3 trials).

CONCLUSION.

It follows that, contrary to expectations and the health column report, the above liniments discussed are fairly stable at ordinary conditions of storage,

the difference in stability under different forms of storage being negligible. I, therefore, recommend that the above standards be included under the respective preparations in the next Pharmacopœia—provided, of course, that the Revision Committee find it advisable and decide to make "official" data of this kind. I am of the opinion that the expression "Cool Place" in the U. S. P. X used in the directions for making soap liniment is too indefinite and conveys the idea that as long as it is kept for twenty-four hours away from the radiator or stove and not exposed to the direct sunlight it is sufficient compliance, but, for reasons pointed out before, it is not sufficient. Neither can satisfactory results be obtained by keeping it at or about 0° C. I should, therefore, suggest that a definite temperature or a range of temperatures, at least, be given in the next Pharmacopœia and my opinion is that about 10° C. would be cool enough to cause all the sodium palmitate to settle out and yet not so cold as to cause the preparation to congeal.

I take the opportunity at this time to acknowledge my indebtedness to Professors Clyde M. Snow and Albert H. Clark and S. W. Morrison of the University of Illinois School of Pharmacy and L. E. Warren of the Drug Research Unit for the valuable aid they have rendered in connection with this work.

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ANALYSIS OF TINCTURE OF LEMON.

BY L. B. FRANCHINA AND FRANK A. LEE.

Some time ago, one of us[1] reported the results of an investigation on Tincture of Sweet Orange Peel, showing the amounts of oil of orange and of alcohol that the official preparation should contain. The results of the work demonstrated that a tincture prepared according to the U. S. P. IX should contain not less than 1 per cent of oil of orange, and not more than 77 per cent of alcohol. In the present work, Tincture of Lemon was studied to determine the amount of oil of lemon present in the tincture prepared as directed by the U. S. P. X. The quantity of alcohol was also determined, although the importance of this assay is not so great as in the previous investigation, because the present pharmacopœia has set a standard for the amount of alcohol that should be present in the official tincture.

The lemons used included four different grades from California, and a mixed grade from the same state; the *Villa Franca* and the *Ponderosa* from Florida; and lemons from Sicily. The usual maceration period of three days was allowed in all cases, accompanied by the customary agitation. Alcohol of the U. S. P. X was used as menstruum, and was shown by analysis to meet the official requirements. The completed tinctures prepared according to the directions of the U. S. P. X, were yellow in color, and were possessed of an odor decidedly more aromatic and suggestive of lemon, than a solution of citral in water. They pro-

[1] F. A. Lee, "Analysis of Tincture of Sweet Orange Peel," THIS JOURNAL (Aug. 1924), 712.

duced the usual cloudiness when added to water, due, of course, to the precipitation of the oil of lemon. The preparation made from the *Ponderosa* lemons was not as aromatic as the others. Furthermore, the color of the tincture prepared from the latter variety was not as deep as that of those made from the other kinds.

The content of oil of lemon in the tinctures prepared by the official process ranged from 1.2 per cent to 2.1 per cent. The quantity of alcohol present, in most cases, was a little lower than that included in the range given in the U. S. P. X. It was found to average about 65 per cent by volume. This result may have been due to the condition of the fresh fruit, or possibly even to mechanical differences in preparing the tincture. The finished tinctures were assayed for total oil of lemon[1] (corrections were applied as directed) and for alcohol content.[2] The specific gravity of each preparation was also taken. Table I shows the results of the work with the various tinctures prepared from the peel grated from the fresh fruit, as directed by the U. S. P. X. Size and condition of the lemons are included.

TABLE I.

RESULTS OF ANALYSES OF TINCTURES MADE ACCORDING TO U. S. P. X.

Source and grade of lemons.	Lemon oil.	Alcohol.	Sp. gr. of tincture.	Av. Wt. of individual lemons.	Remarks.
California Grade 1	1.8%	64.75%	0.89131	75 Gm.	All lemons were clear and surfaces smooth
California Grade 2	1.9%	67.16%	0.89398	65 Gm.	More or less spotted
California Grade 3	2.1%	64.48%	0.88832	56 Gm.	Rough and spotted
California Grade 4	2.0%	66.03%	0.88592	55 Gm.	Spotted. Soft
California Grade 1	1.3%	67.00%	0.89298	70 Gm.	
California Grade 2	1.8%	71.73%	0.87252	62 Gm.	
California Grade 3	1.4%	68.37%	0.89242	57 Gm.	
California Grade 4	1.7%	64.69%	0.89393	55 Gm.	
California Mixed	1.9%	64.65%	0.88840	62 Gm.	Tincture light in color
California Mixed	1.6%	64.98%	0.88765	60 Gm.	Tincture light in color
Florida Villa Franca	1.4%	67.35%	0.89375	150 Gm.	Lemon oil brownish in color. Lemons dark greenish brown in color
Florida Ponderosa	1.2%	66.82%	0.90341	575 Gm.	Seeds symmetrically arranged around the center
Sicily	1.8%	58.35%	0.89268	75 Gm.	Lemons clear and smooth

Tinctures were also prepared from the spent drugs, in order to ascertain the amounts of oil of lemon and alcohol that would be present in such a preparation. The products, however, not having been made according to the specifications of

[1] Official and Tentative Methods of Analysis of the Association of Official Agricultural Chemists (1925), No. 22, 353. (Precipitation method.)

[2] *Ibid.*, No. 18, 352.

the U. S. P. X could not be classed as legal. These tinctures, prepared from the exhausted drugs, were found to contain only a small amount of oil of lemon, as might be expected; and the percentages of alcohol were much higher than were found in the official tinctures. All of the products made in this way were very light in color, and had only a slight odor of lemon. Table II is made up of the results of the analyses of tinctures manufactured from the exhausted drug.

TABLE II.

RESULTS OF ANALYSES OF TINCTURES MADE FROM SPENT DRUG.

Source and grade.	Lemon oil.	Alcohol.	Sp. Gr. of tincture.	At. wt. of individual lemons.	Remarks.
California Grade 1	0.35%	81.63%	0.83832	75 Gm.	All of these tinctures were very light in color. Lemon odor, slight.
California Grade 2	0.10%	82.66%	0.82724	65 Gm.	
California Grade 3	0.10%	88.21%	0.83561	56 Gm.	
California Grade 4	0.40%	88.35%	0.83134	55 Gm.	
Florida Villa Franca	0.60%	76.55%	0.85129	150 Gm.	
Florida Ponderosa	Trace	88.37%	0.83108	575 Gm.	
Sicily	0.60%	88.43%	0.84109	75 Gm.	

Unquestionably the most valuable index of purity of the finished preparation at least so far as chemical analysis is concerned, is the total amount of oil of lemon it contains. However, if a given sample were to run high in alcohol, it could be regarded with suspicion. These tabulations show that the quantity of oil of lemon in the official tincture of lemon should not be less than 1 per cent. The upper limit of alcohol, placed at 75 per cent by the U. S. P. X, is satisfactory.

The tinctures made from the spent drug are: 1. Very low in oil of lemon. 2. High in alcohol content. 3. Low in respect to specific gravity, when compared with the official tinctures. All of these results are to be expected. Most of the oil was extracted during the first maceration. The menstruum first used, also took out most of the water, which accounts for the higher percentage of alcohol in the tinctures prepared from the spent drug. The larger amount of alcohol present in the tincture gives rise to the lower specific gravity. With these results at hand, one could quite easily tell whether or not a sample had been prepared from the freshly grated peel, or from the extracted drug.

In conclusion, it is suggested that standards for the official tincture should be as follows: Not less than 1 per cent of oil of lemon. The upper limit of not more than 75 per cent of alcohol, given in the present pharmacopœia, is satisfactory.

The authors wish to thank Dr. F. H. Heath, of the University of Florida, and Mr. M. Pearce, of Tampa, Fla., for the Florida lemons.

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PRELIMINARY REPORT ON THE EXAMINATION OF THE ALCOHOL-SOLUBLE PRINCIPLES OF A COMMERCIAL ROOT BARK LABELED SHONNY HAW, AND IDENTIFIED BY DR. YOUNGKEN AS VIBURNUM CASSINOIDES, L.*

BY FLORIN J. AMRHEIN.**

The "shonny haw" root bark was first ground to a number 80 powder. Then 2 100-Gm. portions were extracted with 95 per cent alcohol using a continuous extraction process. One of the 100-Gm. portions yielded 12.3320 Gm. of extract and the other 100-Gm. portion yielded 12.3386 Gm. of extract.

Description of the Extract.—A brownish to yellowish brown resinous mass, with a characteristic odor resembling valerianic acid, and an astringent, bitter after-taste. In thin layers, a peculiar yellowish green oily to resinous substance may be seen which is separated with difficulty from the resinous mass in a very impure condition.

The brown extract is slightly soluble in water producing an opalescent mixture, it is readily soluble in alcohol, but is insoluble in ether.

With ferric chloride the aqueous mixture produces an olive-green coloration, and the alcoholic solution produces the characteristic greenish black precipitate indicating tannin.

Both the aqueous mixture and alcoholic solution when treated with dilute acids like hydrochloric and sulphuric, boiled for 3 or 5 minutes, and the mixtures filtered, yield the characteristic precipitate of cuprous oxide with both Fehling's and Benedict's solutions, indicating the presence of a reducing sugar.

The alcoholic solution when hydrolyzed with dilute acid and the mixture carefully distilled yields a distillate possessing the characteristic odor of valerianic acid. The residual liquid in the retort when tested for reducing sugar gives a positive result.

Herman Van Allen in his examination of the principal constituents of *Viburnum Prunifolium* describes a brownish resinous substance of a very bitter taste from which he was unable to separate the sugar. Krämer describes *Viburnin*, an active principle of *Viburnum Prunifolium*, as a greenish yellow resin or neutral principle slightly soluble in water and readily soluble in alcohol. However, from the results obtained in the tests applied to the material extracted from this species of *Viburnum*, I am at the present time led to believe that this resinous substance may be a "resinous glucoside." I arrive at this possible conclusion because of the fact that both reducing sugar and valeric acid are obtained upon hydrolysis of this resinous substance.

This is only a preliminary report and is rendered in connection with Dr. Youngken's paper and it is the hope of the author to present at a later date another paper on the subject containing more definite and conclusive information concerning the general properties of *Viburnin*.

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* See p. 330, April JOUR. A. PH. A.

** Assistant Professor of Chemistry.

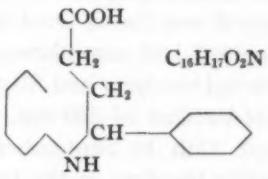
THE TOXICITY OF AN IMPURITY IN OFFICIAL CINCHOPHEN.*

BY ROBERT A. HATCHER.[1]

Part I—The Effects of Oral Doses on:
(*a*) Cats. (*b*) Dogs. (*c*) Rabbits.
Part II—The Effect of Intravenous Doses on:
(*a*) Cats. (*b*) Dogs.
Part III—The Effect on Vessels of Perfused Organs.
Part IV—The Effect on the Vomiting Center.

The Pharmacopœia states that when cinchophen is dried to constant weight over sulphuric acid, it contains not less than 99 per cent of $C_6H_5.C_9H_5N.COOH$, but Mr. John L. Smith, Secretary of Chas. Pfizer & Company, Inc., informed me that "Cinchophen may contain as much as 3 per cent of impurity and yet pass in a very satisfactory manner all the tests now prescribed by the U. S. P." It was in consequence of this fact that I was asked to determine the toxic effects of the impurity, which was supplied in pure form. Mr. Smith described it as follows:

Cinchophen Impurity (Substance 193).
This substance is γ-anilino-γ-phenyl-*n*-butyric acid.
Its structural formula is:



Molecular weight, 255.1. A white, crystalline body; melting point 193–194° C.

Like cinchophen, this substance forms stable salts with metallic bases. The sodium and ammonium salts have been obtained in crystalline form. Both are soluble in water and alcohol.

Two mols cinchophen and 1 mol of this substance form a crystalline double compound, which can be re-crystallized from alcohol without changing its composition. The melting point of this double compound is 183° C.

This substance when heated above its melting point splits up into CO_2 and a base, $C_{15}H_{17}N$. This base forms a characteristic hydrochloride and nitrate, both only slightly soluble in water.

Unlike cinchophen, this substance is readily attacked by oxidizing agents.

With sodium hypochlorite an oily decomposition product with a strong, unpleasant odor is produced.

By bromination in glacial acetic acid a crystalline bromination product, melting point 135° C., is obtained.

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* The investigation of this problem was undertaken at the request of Chas. Pfizer & Company, Inc., and this paper embodies the essentials of the report made to that firm, but the details of the protocols and tracings are omitted. The urines were examined microscopically and tissues were examined by inspection by Dr. Harry Gold of the Department of Pharmacology; the specimens of the stomach, intestine and kidneys were examined microscopically by Professor L'Esperance of the Department of Pathology of Cornell University Medical College.

[1] Cornell University Medical College, New York City.

The cinchophen impurity forms a methyl ester. The ester is liquid at ordinary temperature. On the addition of alcoholic hydrochloric acid to the ester, a crystalline precipitate of the ester hydrochloride is produced.

The impurity was dissolved in four parts of normal sodium hydrate solution and diluted as required in the various experiments. Doses are expressed in milligrams per kilogram of body weight, but the words "per kilogram of body weight" are omitted.

PART I. THE EFFECT OF ORAL DOSES ON CATS, DOGS AND RABBITS.

(*a*) *Oral Doses to Cats.*

A dose of 250 mg. by the stomach tube caused nausea in five minutes, and vomiting five minutes later. The animal was apparently normal the next day. Each of two animals received doses of 500 mg. by stomach tube. In each case there was nausea followed by depression, and death from stoppage of the respiration in 18 hours in one case and in an hour and one-half in the other. Each of two cats received a dose of 1 Gm. per Kg. by the stomach tube. The first caused nausea in 29 minutes and vomiting at intervals during six hours. Reflex excitability occurred after about one-half hour and convulsions in about five hours. There was then diminished reaction to painful stimuli with general depression during observation. The animal was found dead in the morning, 72 hours after the last dose. The second animal had convulsions after two minutes and these were frequent until death occurred one hour and fifty minutes after the dose.

Each of three cats received a dose of 100 mg. of the impurity daily through a stomach tube from August 17th to September 12, 1927 (inclusive, except Sundays) and they were killed by bleeding on the 13th.

The gross examination of the liver, lungs, spleen, kidneys, heart and intestine revealed nothing abnormal in any case. The microscopic examination of specimens of the stomach, intestine and kidneys of these animals showed nothing abnormal or only unimportant changes, of which the pathologist reported, "I cannot tell you their significance."

Specimens of urine of all three cats were collected on September 9th and on the 13th. All showed traces of albumin but none contained casts or cells, and they were not perceptibly different from the urines of two apparently normal cats which served as controls.

The heart rate, respiration rate and rectal temperature were recorded just before the administration of the impurity and about two hours later on August 29th and 30th and September 1st and 2nd, and also on September 7th in case of cats 2 and 3. There was no change in heart rate that could be attributed to the substance with certainty. There was an increase in the heart rate in 9 of the 12 observations of an average of 31 beats, or an average of 15 per cent. The rate was unchanged in two, and in one it was slowed by 24 beats. Spontaneous changes in the heart rate occur in laboratory animals, and it is probable that such changes in rate as were observed were due to causes other than the drug, especially in the light of the observations on respiration and rectal temperature.

The respiration was slowed in 9 observations by an average of $7^1/_2$ per minute, or 13 per cent, but the average slowing in 7 observations was only 5. There was no change in rate in two observations, and in one there was a slight increase. The

changes in respiration were such as one observes without medication and are of no especial significance.

The rectal temperature fell in nine observations by an average of 0.15° C. It rose by an average of 0.2° in four and in one there was no change. In no case was there any significant change in temperature.

The weight of cat 1 fell constantly throughout the administration. The weight before starting the drug was 2.64 Kg. and 27 days later (after a total of 21 doses) it was 1.92 Kg.—a loss of 27.3 per cent. The weight of cat 2 was 2.56 Kg. before starting the administration. Nineteen days later it was 1.92 Kg. after which it increased to 2.0 Kg., and on September 13th it was 1.96 Kg., a loss of 23.4 per cent. Cat 3 lost 13 per cent in weight in the first five days, after which the weight fluctuated slightly, and on the 10th of September it weighed the same as before the experiment. The loss in weight was clearly due to interference with the appetite, which, in turn, is attributable to the local action, causing anorexia, but not distinct nausea.

(*b*) *Oral Doses to Dogs.*

Each of two dogs (A and B) received an oral dose of 500 mg. There was no constant effect on heart rate, respiration or rectal temperature. The dog is more tolerant than the cat toward this impurity as it is toward cinchophen. An oral dose of 500 mg. of the impurity caused vomiting in dog 1, after 50 minutes, on August 15th, hence the dose was reduced to 250 mg. and this was administered daily, except Sunday, to each of two dogs. Dog 1 was killed accidentally by injecting the solution into the lungs after a total of 18 doses. Dog 2 received 250 mg. daily, except Sunday, from August 15th until September 12th inclusive, and was killed by bleeding on the 13th after a total of 21 doses.

The gross examination of the liver, spleen, heart, lungs and kidneys of both animals and the stomach and intestine of dog 2 showed nothing abnormal. The stomach mucosa of dog 1 was congested and showed small ulcers. The entire small intestine and the upper part of the large showed swollen mucosa. This was mucinous, friable and easily rubbed off. It was suggestive of dipheritic enteritis. The lower part of the colon and the rectum were quite normal. It is improbable that the impurity caused the abnormality of the stomach and intestine in this dog, as no such effect was induced in any other animal. No such action can be expected from what we know of the nature of the substance. The microscopic examination of the stomach, intestine and kidneys revealed nothing that could be attributed to the effect of the drug.

Specimens of the urine of dog 1 of August 29th and September 7th, and one of dog 2 of August 30th were examined. None contained albumin or casts. The urine of dog 2 of September 13th contained a trace of albumin, but no blood, pus or casts, and no injurious action on the kidneys could be detected.

The impurity had no apparent effect on the heart and it was not responsible for the changes in rate that occurred, since similar changes occur spontaneously in untreated dogs. The heart rate of dog 1 was 156 before the administration on September 2nd, and 132 two hours later. The heart rate of dog 2 was 144 per minute before the administration of the impurity on September 2nd, and 168 two hours and 25 minutes after the administration. On September 9th the rate was 132 before the drug was given, and it was 144 two hours later.

The impurity may sometimes cause increased respiration but minor changes in rate appear to be quite independent of it. The respiration of dog 1 was 33 per minute before the administration, and two hours later it was 30. The respiration was 48 before administration on the 2nd, and the animal was panting two hours later; on the 9th the respiration before the administration was 24 and two hours later it was 30.

The impurity in the doses used has no effect on the body temperature. The rectal temperature of dog 1 was 39.1° before administration on September 2nd, and 38.9° two hours later. The temperature of dog 2 rose 0.25 of a degree after the administration on September 2nd and it fell to exactly the same extent after that on September 9th.

Dog 1 weighed 5.38 Kg. before starting the experiment. After the first dose of 500 mg., which caused vomiting, the weight fell to 4.88 Kg. on the following day. On September 7th it was 5.04 Kg., a loss of 0.34 Kg. or 6.3 per cent. Dog 2 weighed 6.94 Kg. before starting the experiment. The weight increased steadily and on September 12th it was 8.2 Kg., an increase of 1.26 Kg. or 18.2 per cent. The increase is not attributable to the effect of the impurity, but on the other hand, the results show that daily oral doses of 250 mg. do not interfere with the appetite in the dog, though a dose of 500 mg. may cause vomiting.

(*c*) *Oral Doses to Rabbits.*

Each of three rabbits received a dose of 100 mg. of the impurity daily through a stomach tube; one from October 19th to October 26th inclusive (it died the next day), two from October 19th to November 1st inclusive, except Sundays. There was nothing to indicate the cause of death of the rabbit which died on October 27th; each of the other two was killed on November 2nd by a blow above the medulla.

The gross and microscopic examination of the kidneys, stomach and intestine and the gross examination of the heart and lungs showed nothing abnormal.

In each case the urine in the bladder when the rabbits were killed on November 2nd contained traces of albumin, but there were no casts and no pus or blood in either. The urines of two normal rabbits were examined on November 3rd, 4th and 7th for controls. All showed traces of albumin, none showed blood, pus or casts.

The heart rate, respiration rate and temperature of normal rabbits show considerable normal daily variations, and these were not determined in the experiments. The weight of rabbit 1 showed slight fluctuations above and below that before the beginning of the experiment. Three days after beginning the experiment the weight had increased by 0.08 Kg., or 3 per cent. At the close of the experiment the weight had decreased by 0.14 Kg., or 6 per cent. The weight of rabbit 2 increased slightly after the first day and decreased slightly up to the time of death. The weight of rabbit 3 fluctuated slightly, and it was practically the same when killed as before starting the experiment. The weight before beginning the experiment was 1.98 Kg.; the weight on the last day of the experiment was 2.0 Kg.

PART II. THE EFFECTS OF INTRAVENOUS DOSES.

(*a*) *Intravenous Doses to Cats.*

The intravenous injection of a dose of 100 mg. caused nausea and depression lasting about 24 hours. A dose of 200 mg. caused nausea in 10 minutes in an-

other animal with marked hyperexcitability in about two hours, and lasting about an hour. The animal was apparently normal the next day. A third animal was anesthetized with chloretone, which caused low blood pressure. A dose of 75 mg. of the impurity injected rapidly caused no important effect on heart rate or blood pressure.

The heart rate, respiration rate and rectal temperature were recorded shortly before, and one hour after, intravenous doses of 25 mg. and 50 mg. (total 75 mg.) in each of two cats. Both showed a temporary increase in the heart rate after the first dose, but the second dose injected after an interval of one hour caused no change, or a slowing, in the first cat, and practically none (a slight increase) in the second.

There was no constant effect on respiration. It was rapid in the first cat before the experiment began; it became slower after the first dose and showed the same slower rate one hour after the second dose in the first cat. The respiration rate was normal in cat 2 before beginning the experiment; there was a slight decrease after the first dose, and a considerable increase after the second dose. It is probable that this increase in rate was due to manipulation, because the heart showed no corresponding change.

The rectal temperature of the first cat was 39.9° C. before beginning the experiment. It fell to 38.8° one hour after the first injection, and was 38.5° one hour after the second injection. The rectal temperature in the second cat was 39.4° before injection and it was 39.3° one hour after the second injection, showing that these doses had no important influence on body temperature, though it is possible that the fall in the first experiment was due to the drug.

The intravenous injection of 25 mg. of the impurity caused no change in heart rate during six minutes after starting the injection. The blood pressure rose markedly owing to increased pulse pressure. There was no evidence of vaso-construction. A similar intravenous injection (25 mg.) caused no change in heart rate, blood pressure or pulse pressure in another cat. The intravenous injection of 50 mg. in another cat caused a fall of blood pressure during the injection with a return to very nearly the original pressure after a second injection of 50 mg. The heart rate was slowed slightly. In this experiment, the injection of 100 mg. had very little influence on the circulation. In two other experiments, doses of 25 mg. were injected intravenously into cats. In one case the blood pressure, which had been very high, fell sharply, probably due to variation in the depth of ether anesthesia.

The intravenous injection of 400 mg. of the impurity in 30 seconds caused little change in the circulation during the injection, but the heart stopped suddenly about 30 seconds later. The respiration continued for a short time. In another experiment the intravenous injection of 428 mg. in a period of 18 minutes caused great slowing of the heart during the injection and death by stoppage of the heart. Convulsions occurred when about 300 mg. had been injected, with a rise of blood pressure during the convulsions (probably stimulation of the vasomotor center), followed by a fall of blood pressure. Blood pressure tracings were taken with a Huerthle manometer but their publication here is not necessary.

(*b*) *Intravenous Doses to Dogs.*

The heart rate and the rectal temperature were virtually unchanged after

the intravenous injection of 50 mg., and also after the intravenous injection of 100 mg. of the impurity in the same dog one hour and fifteen minutes later. The respiration rate was temporarily slightly increased after each dose but one hour after the last dose it was the same as before the first dose. One can say that such doses of the impurity have no important effect on the heart rate, respiration rate or temperature in the dog.

The intravenous injection of 100 mg. of the impurity within three minutes in an anesthetized dog caused a slight fall in blood pressure but this dose had no lasting effect on the heart rate or blood pressure. A dose of about 400 mg. of the impurity was injected intravenously in an anesthetized dog in a period of about twenty-eight minutes. There was no important effect when 200 mg. had been injected. Marked toxic effects occurred when 300 mg. had been injected and the total dose caused stoppage of the heart before failure of respiration.

PART III. EFFECTS ON VESSELS OF PERFUSED ORGANS.

A solution of the impurity in 1000 parts of Locke's solution was perfused from a Marriott's bottle at a height of 100 cm. through a cannula in the renal artery, with the kidney in an oncometer. The outflow from the renal vein showed practically no change within fifteen minutes in any case. In one case there was no change in the kidney volume and in the other three the changes were negligible. A solution of epinephrine 1–100,000 was used as a control in the fourth experiment after the perfusion with the impurity; it caused a sharp drop in kidney volume and the outflow from the vein, showing that the vessels were capable of reacting to any constricting substance perfused through them. These results suggest that any changes in blood pressure caused by the impurity were due to the action on the heart or the vasomotor center and not to any effect on the vessels.

PART IV. EFFECTS ON VOMITING CENTER.

Each of four cats received an intravenous injection of 100 mg. of the impurity in ten parts of normal salt solution with NaOH. All showed slight symptoms of nausea within ten to fifteen minutes but none vomited. A dose of 200 mg. also caused nausea without actual vomiting. These results indicate that the impurity has a slight action on the vomiting center in the cat.

Each of two dogs received doses of 100 mg. intravenously. The first showed slight nausea within two minutes; the second showed probable nausea within one minute. Another dog showed nausea two minutes after the intravenous injection of 150 mg. and this dose was followed by muscular twitching in fifteen minutes and increased reflex excitability twenty-five minutes after the injection. One of the dogs which had received a dose of 100 mg. received a dose of 200 mg. dissolved in normal salt solution with NaOH twenty-four hours later. It showed no perceptible effect within about two hours.

These results indicate that the impurity has only a slight action on the vomiting center, but the increased reflex excitability points to action on the cord. The fact that moderately large doses have little action on the respiratory center is in harmony with the observation that it has little action on the vomiting center, since nearly all drugs which stimulate one of these centers stimulate or depress

the other. It is probable that changes in blood pressure are caused mainly by the cardiac actions, though there is probably some action on the vasomotor centers.

SUMMARY.

Intravenous doses of 25 to 75 mg. of the impurity have no important effect on the heart rate, respiration rate or rectal temperature in the cat or dog.

A solution of the impurity in 1000 parts of Locke's solution has practically no effect on perfused blood vessels.

The impurity has only a slight action on the vomiting center after its intravenous injection in cats and dogs. Large doses increase the reflex excitability of the cord and induce convulsions similar to those induced by strychnine. Such doses probably stimulate the vasomotor center briefly.

The cat is much more susceptible to the toxic action of the impurity than is the dog. It is absorbed fairly well from the gastro-intestinal tract of the cat and dog.

The drug usually kills the cat or dog by stoppage of the heart after the intravenous injection of a fatal dose.

Repeated oral doses of the impurity do not cause perceptible gross or microscopic changes in the organs of cats, dogs or rabbits, but fairly large doses sometimes interfere with the appetite in the cat and cause loss in weight.

The latter conclusions are based on the administration of moderate amounts of the impurity to apparently healthy animals for limited periods of time, and one would not be justified in assuming that the impurity would have no effect on diseased organs in man with continued use. It is in the interest of therapeutics that drugs should be as pure as circumstances permit, even though an impurity is of slight toxicity.

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All articles in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which is issued annually. Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A. G. DuMez, University of Maryland, School of Pharmacy, N. E. Cor. Lombard and Greene Sts., Baltimore, Md.

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SPIRIT OF NITROUS ETHER.*

BY WILLIAM A. HALL.

The burden of work in this paper is what the writer accomplished as a member of the Sub-Committee on "Spirits" of the Revision Committee U. S. P. X and so that the results may be known to you all, to the end of marking progress and assisting in solving a troublesome problem, the subject matter is brought before you, with the facts obtained.

After a long period of physiological investigation, study and extended experiments with spirit of nitrous ether, this is addressed to you and you are asked to give a careful consideration of the facts deduced.

Throughout all these trials the utmost care was taken to avoid disturbing errors of observation and to keep our minds clear and open for the true scientific data and deductions. Dr. James Cleland, Jr., a fellow of the American College of Physicians, graciously worked with me in making the physical tests and joined

* Joint Session of Scientific Section and Section on Practical Pharmacy and Dispensing, A. Ph. A., St. Louis meeting, 1927.

with me in the preliminary report in February 1922, to Chairman, E. Fullerton Cook, of the Committee of Revision of the U. S. P.

Reading papers on these investigations and results, by invitation, before the Detroit Medical Club and The Detroit Academy of Medicine—two bodies of most excellent medical standing—I include resolutions each organization passed, expressing the favorable opinion of its members on this preparation, by the Squibb process.

I will give a brief history of this 600-year old preparation especially during the last 100 years as recorded in the successive decennial revisions of the U. S. P. since and including 1820.

The *U. S. P. 1820* process called for nitric acid and alcohol and gave a product containing 4.5% to 5% of its peculiar ether. The *U. S. P. 1830–1840–1850* processes called for potassium nitrate and sulphuric acid in such proportions as would yield the same amount of nitric acid as the preceding called for and also the final yield of nitrous ether 4.5 to 5%.

Dr. E. R. Squibb brought out his process for the manufacture of Spirit of Nitrous Ether in 1856 and this was adopted and accepted by the Revision Committee of the *U. S. P. 1860*. This process folowed the *U. S. P. of 1820* in using nitric acid (in proportional quantity to the KNO_3) obtaining a yield of 5% ethyl nitrite out of 8.33% total ethereal liquid and this process has been followed by his house ever since as yielding, in their judgment, a better product.

I may say in passing, this work has not been pressed by the House of Squibb although at my request they have supplied material for the investigations and have given me what data they could supply from time to time.

The *U. S. P. 1870* followed closely the British Pharmacopœia changing the process by using copper and sulphuric acid on theoretical grounds, but increased the amount of alcohol, thereby lowering the per cent of ether to less than one-third of the *U. S. P. 1860*. In doing this the *B. P.* was followed partly and the *1860 U. S. P.* partly.

The *U. S. P. 1880* left out the copper but retained the sulphuric acid of the 1870 process; washed the crude ether; reduced the 1870 amount of alcohol, yet retained the tests of 1860 and claimed it to yield 4 per cent of ethyl nitrite but really about 2 per cent. So we see the process of different revisions yielded the following percentages of ethyl nitrite:

1820, 4.5–5%; 1830, 4.5–5%; 1840, 4.5–5%; 1850, 4.5–5%; 1860, 5%; 1870, 1.75%; 1880, 2.00%; (*Ephemeris*, Vol. 3, p. 1192).

We now come to 1890, when Dr. Squibb offered the Revision Committee his improved process with 40 years of experience to back it, but which for some reason they did not accept, probably because it wished to have a product containing only ethyl nitrite and not the other crude ethers, and on the supposition that all therapeutic efficiency was due to the ethyl nitrite.

The author claimed valuable properties for his process not possessed by pure ethyl nitrite—which was the only therapeutic agent produced by the accepted 1890 process.

The proposed process gave a product containing 5 per cent of ethyl nitrite and 3.33 per cent other ether *not nitrites*.

	Spir Aetheris Nitrosi U S P IX Process — Concentrated Ether diluted with alcohol (4% Ethyl Nitrite)						Spir. Aetheris Nitrosi, Squibb Process Mfd, 11-13-20. Reg 12-19-21					
	120 min dose undiluted		120 min. + 120 min water taken 15 minutes later		Same dose and dilution taken 48 hours later		120 min., dose no previous dilution		120 min. + 120 min. water taken 15 mints later; same dose & dilution, taken 48 hours later			
Temp. F	Before taking	3 hours after	Before	3 hours after	Before	3 hours after	Before taking	3 hours after	Before taking	3 hours after	Before taking	3 hours after
	98 7°	98 3°	98 6°	98 6°	98 5°	98 5°	98.5°	98°	98 6°	98 3°	98.6°	98.5°
Pulse Rate	84	90	84	88	84	90	84	96	80	86	84	86
Arterial Tension	Systole 138 Diastole 82 mean 110	Systole 130 Diastole 84 mean 107	Systole 140 Diastole 80 mean 110	Systole 135 Diastole 83 mean 109	Systole 140 Diastole 90 mean 115	Systole 140 Diastole 80 mean 110	Systole 150 Diastole 90 mean 120	Systole 135 Diastole 70 mean 1025	Systole 150 Diastole 90 mean 120	Systole 130 Diastole 80 mean 105	Systole 140 Diastole 85 mean 112.5	Systole 136 Diastole 85 mean 1105
Pulse Pressure	56	46	60	52	50	60	60	65	60	50	55	51
Diuresis	58 ozs	67 ozs	58 ozs	60 ozs	63 ozs	59 ozs	56 ozs	68 ozs	60 ozs	71 ozs	61 ozs	71 ozs
Diaphoresis	Good for 3½ hours, not strong after. moderate pricking sensation		Not marked but noticeable for 2 hours Tingling of skin noticed for 3 hours		Slight diaphoresis		Very marked, 6 hours with full bounding pulse marked 4 hours more No pain or headache but sense of fullness in cerebral region		marked for 4 hours and noticeable 4 hours more		5 hours but not so marked as in two previous trials	
Pain & c	15 minutes after taking, slight pain left occipital region, 25 minutes after taking, decidedly strong, but not disagreeably so, pain at base cerebellum, spreading down left pillar persisting 3 hours Equilibrium slightly affected		No pain occipital region, noticed at base of cerebellum but good deal less than when undiluted dose was taken		No pain		Decided prickling sensation all over the body					

15 minutes after mixing Spr. Nitrous Ether with water Ethyl Nitrite loss is 33%
48 hours after, loss is 75%
Other ethers than the nitrite, little affected

The washed complex ethereal liquid of the Squibb Process is about 8% before dilution with alcohol, of which 5/8 is Ethyl Nitrite

OBSERVATIONS ON ALL THE SERIES

Reduction in ARTERIAL TENSION much more from complex ethereal liquid

Diuretic action more from " "

Diaphoretic " much " " " "

Pulse accelerated more by ETHYL NITRITE

Antipyretic action more by " "

than by complex ethereal liquid, but much more from ETHYL NITRITE content in the Squibb process than from pure ETHYL NITRITE in U.S. IX process, showing apparently that the complex ethereal liquid affects the result

Approximate Results:

Deductions of DIAPHORETIC action of the whole series with ETHYL NITRITE content as determined and deduced U.S.P IX meaning: concentrated NITROUS ETHER diluted with alcohol to contain 4% ETHYL NITRITE RESUTS are approximately proportional

WILLIAM A. HALL. PH. B.
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Dose	Ethyl Nitrite Content	Complex Ethereal Liquid minus nitrites	Action
U.S.P IX 120 minims	4%		45%
U.S.P. IX 120 minims + 120 minims H_2O	2.66%	(15 minutes)	22%
U.S.P. IX 120 " + 120 " H_2O	1 %	(48 hours)	10%
Squibb Process 120 minims	1.59%		75%
" " 120 minims + 120 minims H_2O	1.03%	(15 minutes)	42.7%
" " 120 " + 120 " H_2O	.40%	(48 hours)	34%
" " 120 minims	4.79%	2.89%	100%
" " 120 minims + 120 minims H_2O	3.19%	(15 minutes)	50%
" " 120 " + 120 " H_2O	1.20%	(48 hours)	25%

The *1890 U. S. P.* product was made by sodium nitrite and sulphuric acid and, as stated before, consisted of an alcoholic solution of ethyl nitrite (4%).

The *1900 U. S. P.* product was the same and

The *1910 U. S. P.* product was also the same.

Now after this brief statement, descriptive of the U. S. P. products from 1820 down, we come to the crux of the matter: Is the present U. S. P. process which produces *only Ethyl Nitrite* 4%, inferior or superior to the product made by the 1860 U. S. P. process as judged by therapeutic standards and results? Is it desirable to continue this process into the U. S. P. X, or take up the process *proposed* for the U. S. P. 1890, used with very favorable results for 72 years and practically the same as that of the U. S. P. 1860?

To answer these questions, the extensive series of tests and observations were undertaken, the results of which are shown on the chart included with this paper. The present U. S. P. product is practically a 4% alcoholic solution of *Ethyl Nitrite;* the proposed process product contains about 8.33% of a complex ethereal spirit $^{5}/_{8}$ of which is *Ethyl Nitrite* and $^{3}/_{8}$ *not nitrites at all* but other ethers and nitrous compounds which are physiologically strong in their action and add greatly to the effect of ethyl nitrite alone. In addition there is ethyl nitrate and traces of acetaldehyde, di-ethyl-ether and acetic acid.

Our *first* series was tried with a Squibb product, two years old and assaying 1.59% of ethyl nitrite, the *second* series with Squibb's product one year old and assaying 4.79% ethyl nitrite; the *third* series with a U. S. P. product assaying 4% ethyl nitrite. All the tests were repeated two to five times so as to narrow any possible errors.

Having done considerable work on this preparation, at intervals, during the past 25 years, I have been confirmed in my opinion of the marked superiority of the Squibb process product as compared with the pure ethyl nitrite, and the especial value of the preparation in reduction of arterial pressure. Recent study during the past five years has confirmed and enlarged my opinion of the value of the earlier results along with the development of more exact data.

Dr. Squibb said (*Ephemeris*, Vol. 3, p. 1235–6):

"The writer has never been able to assent to the proposition that *Ethyl Nitrite* is the only element of therapeutic value in Spirit of Nitrous Ether, and therefore that a solution of this ether in alcohol should take the place of the solution of the *complex ethereal liquid* in medicine." (Then he comments on several papers taking that view.) Continuing, he says: "*First* the favorable experience of 600 years (from Raymond Lilly in the 13th century) with preparations which, for a long time were crudely made and badly kept, should not be so easily set aside. These have often contained a considerable proportion of other ethereal products, and the sensible properties have been fairly uniform. *Second*, because, under the most favorable conditions, ethyl nitrite does not constitute over $^{2}/_{5}$ of the complex ethereal product which is the basis of spirit of nitrous ether, while the other $^{2}/_{5}$ belongs to an ethereal series known to have definite physiological effects."

I ask a careful study of results as shown on the chart and especially call the attention of the committee to the *Diaphoretic* table showing the *Squibb product* to have over twice the effect of the *U. S. P. IX* product; similar comment on "*Arterial Tension*" and "*Temperature*" and on *Antipyretic* effect. The diuretic effect also shows a marked difference. Please note also the loss in ethyl nitrite content in *15 minutes* and *48 hours* by dilution with equal volume of water and

the logical inference that the 3.33% complex ethereal liquid—not nitrites—is responsible for the marked therapeutic results.

The nitrites' content goes off first in the decomposition of the preparation while the *complex ethereal* spirit, not nitrites, persists for a much longer time and gives valuable physiological results. (Shown by data with the two-year old specimen containing only 1.59% ethyl nitrite and especially in comparison of results between the U. S. P. IX spirit and the *one*-year old Squibb process product.)

When Spirit of Nitrous Ether (U. S. P. 1860) is taken, the effects are very even with *scarcely any pain;* apparently the *ethyl nitrite* content is tempered and controlled by the *complex ethereal liquid*, so that one obtains the results with very little disturbing influence in the way of pain.

I am endeavoring to obtain the coöperation of an expert investigator of Yale University as to the composition and physiological effects of the $3^1/_3$% complex ethereal liquid not ethyl nitrite, but for the present he is unable to tackle this problem owing to the pressure of other work.

Included is a process proposed for the manufacture of this spirit.

PROCESS PROPOSED FOR SPIRIT OF NITROUS ETHER.

An alcoholic solution of a complex ethereal liquid composed of ethyl nitrite and other ethers. This complex ethereal liquid comprises about $8^1/_3$% of the finished spirit and yields on assay 5% on an average, of ethyl nitrite and $3^1/_3$ of other ethers, mainly ethyl nitrate with smaller amounts of ethyl acetate, acetaldehyde and acetic acid.

Alcohol: specific gravity 0.817 at 15° C., specific gravity 0.808 at 23° C., sufficient quantity or 1065 cc.

Nitric acid (67.6%) 163 Gm.

Sodium bicarbonate 20 Gm.

Aq. Ammon. fort. 2 cc.

Into a one-liter flask put alcohol 475 cc. and slowly add, while stirring constantly, the nitric acid. Mix and pour into a one-liter distilling flask into which a few pieces of broken glass have been placed. Stopper with a cork containing a thermometer and connect side arm with a Liebig condenser. To the other end of the condenser is attached an adapter, the end of which goes into the neck of a one-liter flask which is stoppered with a cotton plug. The latter flask, acting as a receiver, is marked where it will contain 475 cc. and is immersed in ice. A strong stream of cold water is run through the condenser. Heat the distilling flask by means of a water- or steam-bath, seeing the temperature does not rise above 85° C. and regulate distillation so that the liquid comes only by drops from the condenser. It may be necessary at times to remove the source of heat. Control too vigorous action by means of an ice-water bath. Continue distillation until distillate measures 475 cc.

Rinse apparatus with water followed by alcohol. Add to distillate sodium bicarbonate, 20 Gm. Mix intimately and transfer into the one-liter distilling flask. Make connections as before with receiver packed in ice and marked at 415 cc. Use very little heat for distillation which should be carried on very slowly. To the distillate (415 cc.) add alcohol, 590 cc. Mix and add stronger ammonia water, 2 cc. Mix and transfer to 8-oz. amber bottles and store in a cool place.

GIGANTIC MERCHANDISE MART FOR CHICAGO.

Chicago is to have a gigantic merchandise mart in its own building which will be twice the size of the largest business structure in the world. This mammoth structure is to be two city blocks in length, and is planned for the service and convenience of merchandise buyers; in it will be housed foremost manufacturers, wholesalers and importers. There will be incoming and outgoing freight stations on the ground floor of the building. The approximate cost is $30,000,000.

BIOLOGICALS VIEWED AS PHARMACEUTICALS.*

BY JOSIAH C. PEACOCK.

The prominent rôle which biologicals are playing in both prevention and treatment of disease calls for a consideration of them from every angle that will add to the pharmacist's understanding of these agents.

While pharmacists are accustomed to grouping medicinal substances into such classes as crude drugs, chemicals, galenicals, biologicals, etc., as items of materia medica, biologicals can scarcely be looked upon as other than pharmaceuticals, especially since it is the province of pharmacy to provide and dispense all medicinal substances.

In the course of the day's work, it is customary for the pharmacist to think of the substances which he handles in terms of composition, a practice which makes it advantageous to have a mental picture of the composite nature of biologicals as well as of the other materials that are dispensed.

Now while dispensing pharmacists are familiar with the conversion of crude drugs and chemicals into galenicals and other finished preparations it is their commonly accepted practice to purchase biological products, and to sell them without occasion to as much as see the contents of the packages, seldom or never having need to combine them with other substances. Accordingly, pharmacists have but little or no opportunity to become familiar with the composition of biologicals.

Indeed the two antitoxins and smallpox vaccine which are official in the U. S. P. X are described and otherwise dealt with by this authority as finished products only, thus implying as in the case of the chemical substances that biologicals will likely be made by laboratories which specialize in the production of such materials.

While biologicals may be regarded apart from galenicals and other groupings of materia medica, just as the galenicals are so generally considered as the finished preparation of the given active agent which they contain, biologicals also have this definite aspect of a pharmaceutical nature.

According to the proximate or composite nature of the galenicals, it is customary to group them, as is done by the Pharmacopœia and National Formulary, into the well-known classes recognized by these authorities. Now that same thought may be applied to a recognition of the comparatively simple nature of the diluent or bulk of any biological preparation, thus looking at the biologicals from the standpoint of formula or composition, that is from their pharmaceutical nature.

To know the biologicals from the standpoint that shows this character affords an understanding of them which is of practical value in discussing these items with physician and public; and in these days when fiction is featuring the facts of immunology it is well to be prepared to describe biologicals.

Again biologicals like other pharmaceutical preparations are designed for certain purposes and like the latter have limitations as to suitability for application as well as of serviceability for effect; hence, in the source or nature of the essential

* Presented before Section on Practical Pharmacy and Dispensing, AMERICAN PHARMACEUTICAL ASSOCIATION, St. Louis meeting, August 22 to 27, 1927.

constituent or in the method of use will be found the reason that governs the make-up or composition of these preparations, just as there is reason for selection of solvent or other variation in the formula of a galenical.

The official descriptions of diphtheria and tetanus antitoxins and of smallpox vaccine specify the solvents or diluents to be used in these preparations, and it is a matter of practical knowledge to note that these same few liquids (glycerin, water, or water and salt) are those in practically every other biological which the pharmacist dispenses.

This acquaintance with biologicals as finished preparations brings them well within the scope of true pharmaceuticals, and it will be noted that the well-known glycerite, solution, etc., are the classes of preparations under which biologicals may be grouped.

While some biologicals are transparent solutions, most of them are translucent suspensions of matter which is only slightly, if at all, soluble in the diluent, some biologicals being on that account designated as emulsions or suspensions.

Following the foregoing thoughts, if smallpox vaccine is followed through its process of production the pharmacist will be inclined to look upon it as a glycerite, for the reason that when the serum-moist vaccine material is removed from the calf it is ground with glycerin and the resulting mixture filtered to remove all solid particles. It will be recalled that some years ago smallpox vaccine was referred to as glycerinized lymph.

Koch's Old Tuberculin, the tuberculin most generally employed, is pharmaceutically a glycerite as the method of production will show. For test purposes and for administration as treatment, this tuberculin is diluted with physiological salt solution. Other forms of tuberculin are suspensions or emulsions in physiological salt solution with or without the presence of other substances which have been used in the medium on which the tubercule bacillus was grown.

Since most biologicals are used by injection into the tissues (usually under the skin, but sometimes into muscle, nerve, blood or spinal fluid) attention is paid to having the diluent miscible with and otherwise appropriate for contact with the fluid of these tissues. This requirement is met by use of physiological salt solution, also known as normal saline, for conveying the essential biological agent. The reason for using this vehicle will be gathered from the following paragraph which is quoted from one of the dispensatories.

"When pure water is brought in contact with the blood it causes alteration in the red blood corpuscles, allowing the escape of hemoglobin from them into the plasma; this is known as laking of the blood. The addition of inorganic salts to the water, in quantities sufficient to make a solution of the same osmotic tension as the blood serum, prevents this action on the corpuscles. When a solution contains just the amount of salt necessary to prevent laking it is said to be isotonic with the blood. Because of its non-toxicity sodium chloride is the salt usually employed for the purpose of preparing an isotonic solution. The amount of salt necessary for this purpose varies in different animals; in the human being it requires an 0.9 per cent solution of sodium chloride, but an 0.6 per cent is isotonic with ox blood. This isotonic solution is sometimes spoken of as normal salt solution, an unfortunate term, as it is likely to be confused with the normal solution of sodium chloride used by chemists, which is nearly seven times stronger. A much better term is the official name, physiological salt solution."

Numerous slight modifications of this fluid are made by adding certain other salts which are constituents of the blood serum besides the sodium chloride, but,

for the reason given, it is always desirable to preserve the important feature of isotonicity.

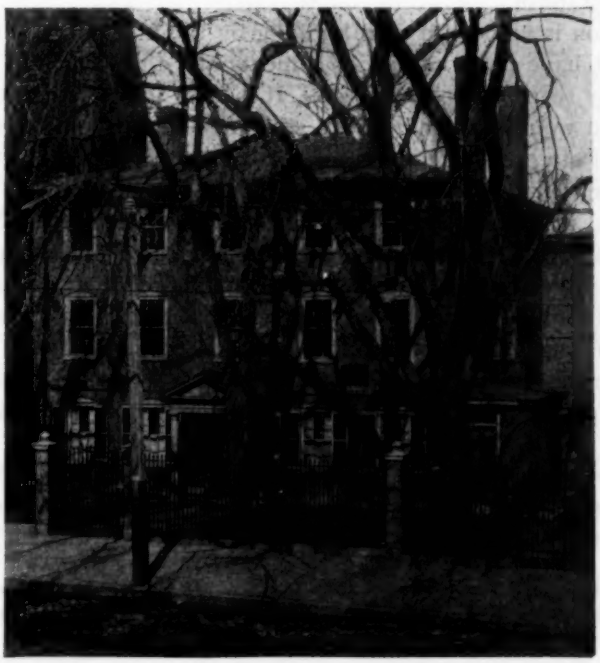
The extent to which physiological salt solution is used as the diluting or suspending vehicle, as well as an indication of its wide range of serviceability, becomes apparent in the fact that the following well-known biologicals are prepared with it—antitoxins, bacterins or bacterial vaccines, serobacterins or sensitized bacterial vaccines, pneumococcus antibody solution, toxins for detecting susceptibility and for active immunization, diphtheria toxin-antitoxin, rabies vaccine, protein solutions for testing and for desensitizing purposes including hay fever pollen extracts.

Normal horse serum and the unconcentrated serums (all of which are the filtered serums of the horse's blood) may properly be regarded as solution of their respective active constituents in physiological salt solution.

Besides being used in smallpox vaccine and old tuberculin, as already mentioned, glycerin is used in some forms of rabies vaccine, in Schick test toxin and in the glycero-saline pollen extracts.

To lengthen the preservation of biologicals, the authoritative standards permit the addition of from 0.25 to 0.5% of cresol or phenol to most of the biologicals. In some products, glycerin is used as a preservative.

As regards the answers to the many questions on other matters pertaining to biologicals, it will be a very exceptional occasion when the pharmacist and physician together will not be able to find the answer in the package or through their reasoning together.



Home of the Poet, Henry W. Longfellow, Portland, Me.

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted By Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor also will undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

WHY THE CHAIN DRUG STORES DON'T GROW FASTER.

BY A WELL-KNOWN CHAIN STORE OPERATOR.

The casual reader or the store owner troubled with chain competition may think from the heading of this article that there is a catch in it somewhere. In their observation and experience the chains are growing and growing too fast to suit some people.

My own experience has been limited to the field of chain drug stores. At least so far as our own experience in this field goes, I can say that we would and could grow much faster than we already are growing, but for one factor. That one factor is a lack of qualified people capable of running stores for us. That is to say, we have the money available to start new stores, we have the locations picked out that we are sure would prove profitable, but we can't go ahead any faster than we are for lack of qualified people to operate any additional stores that we might establish.

The situation is made still more striking by the fact that the new stores we establish do not have prescription departments and therefore it is not necessary for us to employ registered pharmacists. It is easy to see how the expansion of this organization would be handicapped still further were we compelled to make our selections of store managers and numerous other employees exclusively from registered pharmacists.

Of the total operating expenses of a retail drug store 60 to 75 per cent are payments for salaries. Therefore the question of getting an adequate return for the salaries which are paid far overshadows in amount all other operating problems and of course determines in large measure the success or failure of a particular store.

If there are any unemployed people experienced in the retail drug business who read this article, I suppose their first impulse would be to write to us asking for work. Our problem is not, however, a lack of applicants but a lack of *qualified* applicants.

What makes a qualified applicant for the managership of a store which sells most of the lines ordinarily found in drug stores seems to be a combination of attributes which, in our experience at least, are exceedingly difficult to find in one person.

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* Instructor of Merchandising, Wharton School of Finance and Commerce, University of Pennsylvania, Lecturer on Business Administration, Philadelphia College of Pharmacy and Science.

A few quotations of our experiences with different types of people will give an idea of some of the difficulties we meet with most frequently.

One of the most successful store managers we have ever had is a man who before he came to us had never worked a day in his life in a retail store. Long past middle life, he was suddenly let out of an office position which he had held in a manufacturing plant. A consolidation simply had made his services no longer necessary with them.

We hired him with some misgivings. In a few months, he had more than made good. We pay our salespeople a small salary and various commissions and bonuses which make their compensation decidedly worthwhile if they are sufficiently skilled to build up their volume of sales. The salary we pay is so small that no one would be content to remain long working for it alone. Therefore the unfit automatically eliminate themselves when they have failed to demonstrate their ability as salespeople.

There is nothing sensational about this man's methods. He has a tremendous capacity for making and holding friends and he simply has turned that ability to making friends for himself, his store and the merchandise he sells. This man seems to inspire confidence as well as good will. His age and his appearance help to create these impressions.

Add to this the fact that he came to us with absolutely no previous retail experience and, therefore, no preconceived notions on how a retail business should be conducted. He was willing to try with all his energy and skill to put into effect the plans and ideas which we had found productive. He had a serious interest in making good to the best of his ability because satisfactory new positions for a man his age are hard to find and this opportunity, if he succeeded, meant a good living for him as well as definite possibilities for advancement.

It is hard to beat this combination of a deadly earnest person who is enthusiastically anxious to succeed in his work and is willing to make use of and profit by the successful experience of others. Add to this a natural ability to make friends and inspire in them confidence and good will and there results a person who cannot help but succeed in our work.

I think that one of the reasons we have had failures among very young men is their unwillingness to take their work as seriously as it should be taken. They haven't yet had enough experience in business to see everlastingly that increases in their own income can only come from additional business and profits which they themselves create or help to create.

Then, too, anyone who has had any success in the development of a retail business knows that his development is a matter of years of painstaking effort and careful and efficient attention to endless detail. Anyone who is to participate in and obtain the rewards from the development of a successful retail business must be prepared, therefore, to stay with it for an indefinite and lengthy period.

Some young people whom we have employed don't seem to have this requisite patience and perseverence. If rewards don't come quickly and in large amount they are dissatisfied and soon are off into some other line of work, perhaps to repeat their performance there. Needless to say, this is unsatisfactory for us as well as, in the end, for them.

At first thought, it would appear that registered pharmacists would make excellent salespeople for us because of their technical knowledge of practically everything that we sell. After all, the first requisite of successful salesmanship is to know the merchandise and a man trained in pharmacy certainly ought to have that knowledge of what we sell.

It would be a mistake, of course, for me to condemn the sales ability of all pharmacists simply because of unfortunate experiences we have had with some. My point merely is that the fact that a man has had technical training in pharmacy is by no means an assurance that he will make a successful retail salesman of pharmaceutical products. Some of these men, from inclination and ability, seem best fitted for manufacturing and research laboratories. Others are qualified as detail men or traveling salesmen and still others are especially skillful in compounding prescriptions.

While the earnings of our store managers will run as a general rule higher than a pharmacist could earn in an ordinary drug store we find many of them are reluctant to accept positions with us because of our salary, commission and bonus method of compensation. That is to say, they lack faith in their ability as salesmen. They prefer the certainty of a smaller salary to the uncertainty of a larger compensation with us which they receive only if and as they earn it.

Because the salary expense is by far the largest single operating expense incident to the operation of all of our stores, we try to assure ourselves in every possible way that the expenditure we make will be profitable for us, for the persons employed and for our customers. Our success in a new location is therefore dependent to a very large extent upon the type of people whom we put in the store. In fact, so important do we consider this personal problem that, as I said in the beginning, we will not consider opening in a new location until we have available the people who we feel sure will operate that store with profit to all concerned.

We desire, of course, to expand our business, but we feel that any expansion which would be carried forward without the foundation of competent and qualified assistants would court disaster in the end. Those qualifications which we have found most useful in our salespeople in building up the business of our newly established stores are a sincere willingness to make friends and thus build confidence and good will for the salesperson, the store and its merchandise and a loyal, earnest and enthusiastic steadfastness of purpose which thrusts aside obstacles, sincere in the belief that whatever benefits the business will benefit in like measure those responsible for its success.

INCREASING NET PROFITS BY INCREASING AVERAGE SALES.*

BY W. BRUCE PHILIP.

Before taking up his subject the speaker ascertained that there were seven instructors in colleges of pharmacy and somewhat more than double that number of retailers present at this session of the Section on Commercial Interests. He stated that his talk had as a purpose to intensify and second the remark of the

* An address before Section on Commercial Interests, A. PH. A., St. Louis meeting, 1927.

Chairman, when he said the redeeming part of the program is in the discussion. He continued:

"In the commercial course of the Department of Pharmacy of the University of California, I have tried a plan of instruction that will be illustrated in the remarks to follow and I wish all to take part in the discussion.

"Inasmuch as the second- and third-year classes consist of one hundred to one hundred and twenty-five members, it would be unwise to waste a lot of time with roll call and it is not practical to have much oral discussion. In distributing a slip of paper to each student at the opening of the lecture I tell them at the first lecture that at the end of the hour a question will be asked and every one must write an answer, and so we have at the same time a roll call and a written recitation.

"It is true that the same question is asked of every student. This has many values. First, the instructor knows whether he is putting over his subject. Also, he learns a lot. The students do not desire to go to sleep during the lecture for fear they will sleep at the wrong time.

"I ask those present to put their name and address on the paper and be perfectly frank in answering the question, which I will later ask.

"I have found by experience that if you read your lecture you lose a certain effect you gain from looking the class in the face. This is my only alibi for not having a written paper.

"In teaching a course of pharmacy you must start with fundamentals—give these fundamentals and let the pupils work out the rest. If you are going to talk about a subject, the class must first understand what the instructor has in mind. Therefore, we start with definitions. Let us start with the definition of 'average sale.' The average sale is the amount received by dividing the total amount of sales by the number of customers waited upon during a certain period of time. We are talking about net profit. Net profit is the amount of money the business earns, not the proprietor, but what the *business* earns.

"Now we have mentioned the word 'sale.' We can say that the sale is the amount of money that is taken in during a transaction with one customer or individual at one time, and when we come to net profit we know that the net profit is the sale less the cost of the merchandise and the overhead.

"We will take as a unit the coin known as a dollar. Can you imagine that this is a large picture of a dollar (pointing to picture on wall) and is in the customer's pocket? The problem is to bring the dollar from the pocket into the cash register. That dollar when it is transferred from the customer's pocket to the cash register does not belong to the proprietor. Approximately, two-thirds of that dollar must be kept as a trust to buy new merchandise to replace the merchandise that is sold. Twenty-five to thirty per cent—another big slice—must be kept to pay rent, fire insurance, clerk's salary and telephone, all of those things considered overhead; what is left, presuming there is something left, three to eight per cent, or perhaps even ten per cent, is the net profit. Net profit is the thing we are endeavoring to increase. That is the only thing the proprietor or owner of the store has. He cannot possibly say that money to replace merchandise or the money necessary for overhead is his, and that is one of the reasons too many failures occur to-day.

"We will imagine the dollar drawn out in a straight line and divided in three parts, one part is merchandise, one part overhead and one part net profit. We are going to increase the net profit. Every time a customer comes in with a dollar there is a possible dime, quarter, dollar or twenty dollars still in his pocket which can be brought over the counter and put in the cash register and increase not only the average sale but the net profit. As you look at this picture you do not begin to grasp all until you appreciate by figures given just what increasing the average sale means. The figures I will read can be made to show a larger or smaller net profit but I want to give them to you so they are easy to grasp.

"Supposing we have 100,000 sales. These 100,000 sales average fifty cents, or we have a total volume of $50,000. Approximately sixty-eight per cent is the cost of the merchandise; that amount is $34,000. Then we have an overhead of twenty-eight per cent, which is $14,000, or a total of $48,000. We have taken in $50,000; we have paid out $48,000. We have $2000 which is really and truly ours. We can do anything we please with that $2000 as it is true net profit.

"Now supposing we increase the average sale five cents. That means that every sale must be increased five cents or every other sale ten cents, or every twentieth sale one dollar, fifteen or twenty sales without any increase and a dollar sale extra, and so on until we have one hundred thousand sales increased five cents each. That means we have taken in $55,000. The cost of the merchandise we have sold is $37,000. The rent is the same. If these additional sales have been made without extra clerk hire, without extra telephone, etc., then we have the same overhead of $14,000. We have $55,000 taken in and $51,000 has been paid out. That means a net profit of $4000. Two thousand dollars profit on 100,000 sales at fifty cents—$4000 profit by increasing each sale five cents! It doesn't seem possible but nevertheless if these figures are true, raising the amount of the average sale is certainly worth while. If that is not true, wherein is it wrong? In the first place, the overhead and second largest slice of the dollar is based on the amount of business that you do during the entire year. You can not take it out of the first sale or the second sale. However, if you figure your cost of doing business on this extra $5000 which was not figured in here, you will still have your $4000 profit if you are a competent enough manager to take this increase without increasing your overhead. In other words, the increase of the average sale is one of the most essential things for increasing the net profit.

"If that is so, how are you going to get this additional nickel, dime or quarter? We could discuss this for a long time. My opinion, based on visiting many stores and talking to many managers of stores, is that three things are vital to obtain the extra profit by increasing the sale. The first is based on sight. Sight sells more merchandise than anything else I know of. Sight builds up five, ten and fifteen cent stores. The merchandise is there, you see it and buy it. If you do not believe it, go into a good, well-arranged five, ten and fifteen cent store with only one purpose in mind, that purpose being to buy one item only, and sight will make you buy two or more items, even if you know in advance that you go there for only one.

"Therefore, the retail druggist must build for additional sales by having in sight merchandise that is for sale.

"*One* of the best selling lines is something to eat. We have not yet overcome the desire to have something to eat and the beautiful part is that just as soon as it is gone, there is a possibility of a repeat or additional sale even before the customer has left the store, so I feel one of the very strongest of the sight attractions is something to eat.

"*Next* are those little knick-knacks that bring out ten, fifteen and twenty-five cents. Then something that has quality to bring out the dollar and more. We make big sales on quality merchandise. It is sight that makes a customer pick up an article and say 'This is mine. You can't have it back. Here is your money.'

"*Second*—knowledge. There are clerks that can build up a sale. I have seen a sale built up from fifteen cents to forty-five dollars by a clerk who knew how to build up that small sale until it was a worthwhile one.

"*Third* is brains. I felt in looking over the students that are entering the College of Pharmacy (they have already opened in California) I had never seen a finer, cleaner group of young men entering to learn pharmacy. They have brains. Brains should be used to build up indirectly the average sale increase. By that I mean bringing into the sale, immediately or later, the elements that we should prize and hold dear—Professional Pharmacy. It would be impossible when a person comes into a store to immediately talk prescriptions or clinical thermometers. I had not practiced law very long before I learned something that has been invaluable. They say if you get the opposition witness on the stand and get him to talk long enough he will win your case for you. It is not the best of salesmanship to talk to the customer. Make your customer talk to you. Ask him questions. Ash him 'How is little Johnnie?' If little Johnnie is sick, ask who is the doctor. If he hasn't had a doctor, a suggestion from you may lead to a doctor coming in, and this will lead to prescriptions. Thus briefly, I have told you how to increase net profit by increasing the average sale. I have given just a foundation on which you must build.

"Now the question I want each one to answer on this paper is, 'How do *you* think the average sale can most easily be increased?' "

Mr. Philip gathered up the papers and read the following answers written by those in the audience:

"1. By proper display of goods and attractiveness of arrangement with price tags.

"2. By proper display of saleable merchandise.

"3. Display and asking to buy. Often they say 'Yes.'

"4. By selling larger sizes of packages or larger quantities.

"5. By mass display with price.

"6. Use tact, intelligence and college training.

"7. Show merchandise; never directly solicit sales.

"8. By offering two or three of the items asked for, as gum, cigarettes or tooth paste." He commented:

"May I suggest that you do not overdo by showing too many items. Be sure you show the best piece of merchandise first; also, that the merchandise is placed in the hands of the prospective customer with just a few clear cut words as to just why it is the merchandise which should be bought." He continued in the reading of answers:

"9. By increase of price.

"10. By having good-looking clerks.

"11. Use your brains—See What you Sell—Sell it in Glass." He continued:

"One of the best merchants told me in a drug store all glass was good for was to create sales resistance.

"If you have beautiful stationery, however, or other things that are easily spotted, it is better to have that merchandise under glass to keep it clean. A person, willing to pay a good price for a fine box of stationery, does not want the top paper soiled. The sale may depend upon the beauty of the package."

Mr. Philip read further answers:

"12. By courtesy and interest in the customer's family.

"13. By suggesting merchandise closely allied to customer's original purchase."

He commented that the drug store without a list of correlated merchandise is overlooking one of the best schemes for increasing the average sale. Mr. Philip continued in the reading of answers:

"14. By getting the customer to talk.

"15. The average sale may be increased by better displays, mental suggestion, proper coöperation of the personnel of clerks and using good common sense in your sales talk.

"16. Proper displaying of goods and ability to suggest a kindred article.

"17. By suggesting and calling attention to correlated items.

"18. (*a*) Splendid well-planned window displays to get them in. (*b*) Irresistible displays inside the store to tempt them once they are in. (*c*) Clever and diplomatic handling of the customer by the salesman.

"19. By suggestion—many times increased sales are lost by not showing in an attractive manner."

Mr. Philip commented that attractiveness comes from knowledge—he had never seen a clerk show merchandise that he knew in an unattractive manner. He continued the answers:

"20. By an interested attitude on the part of the clerk in the personal status, desires, wants, etc., of the customer.

"21. By improvement of display methods plus increasing the interest of the clerks in the increase in sales."

Mr. Philip commented—"In increasing the interest of the clerk, a little raise in salary and perhaps a theatre ticket now and then is worth more than the price of the ticket."

He continued the reading of answers:

"22. Goods in sight, attractive surroundings, immaculate cleanliness, pleasant manners, clean salesmen, knowledge of goods.

"23. By showing a real interest in the customer's welfare and wants."

The author stated that he tells the boys that young men cannot fail as salesmen if they are perfect gentlemen.

ABSTRACT OF DISCUSSION.

Robert J. Ruth found the method employed by Mr. Philip very interesting. He pointed out that sales stimulation might be overdone; sales might be made without retaining the custo-

mer's patronage. He had known of overdoing efforts in making additional sales and companion sales.

Charles W. Holton asked how the cafeteria in the drug store could be excused. **Mr. Philip** did not think this was necessary; **Mr. Ruth** said that side-lines were necessary for defraying expenses and bringing profit, and his viewpoint on the subject had changed from a very restricted one to a much broader one, as conditions of business varied greatly.

THE DOCTRINE OF SIGNATURES.*

BY LEO SUPPAN.

When, where and how the belief originated that the form, color, taste and other properties of a plant are indicative of its medicinal properties may be an interesting subject for conjecture but is impossible of solution. Perhaps it represents a phase of sympathetic magic general among all primitive races. That it is very ancient is certain, and of its prevalence in the earliest historic times of which we have records we have evidence more or less complete. At first an element of folk-belief, it became in the period of the Renaissance a well-defined scientific hypothesis, not based upon facts, to be sure, but the product, rather, of the imagination, the source of much of the speculation and theorizing of that active age. It was Paracelsus who raised it from the humble state of folk-lore to the dignity of scientific doctrine, and it was through the influence of his own domineering personality and the almost servile acceptance of all Paracelsian teachings by his pupils and the dissemination of these ideas by the spoken and written word that it maintained its place for nearly two centuries. The doctrine is known as that of "Signatures."

Traces of the belief are evident in the medicine of ancient India, where we find plants with yellow flowers recommended for the cure of jaundice. In China it is very old and is a fundamental principle in materia medica even at the present day; we all know the importance the Chinese physician attaches to ginseng and the high price a Chinese herbalist will pay for a specimen closely resembling the human figure in form. The Chinese have developed the belief in considerable detail. They divide the plant regionally into three parts: the upper parts, such as flowers, buds and so forth, being regarded as efficacious in treating maladies of the head; the middle parts, that is, the stem and its appendages being recommended for diseases in the trunk, while the roots and rhizomes are a specific for troubles in the feet and legs. This correspondence holds also for drugs derived from the animal kingdom: the skin of the elephant is useful in affections of the skin, the lungs of various animals for diseases of the lungs, and so on. Chinese materia medica, further, divides drugs into male and female, the active warming or cooling drugs being classified as male, while the milder, sour, bitter, sweet and saline drugs are relegated to the female class. This classification is not so much a consequence of the belief in signatures as a corollary from the postulate of the Yang and the Yin, the male and female principles which, according to Chinese philosophy, constitute the basal elements of the universe and which play so important a part in their symbolism.

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* Section on Historical Pharmacy, A. PH. A., St. Louis meeting, 1927.

The belief in signatures is well represented among the peoples of classical antiquity by the marvellous powers which these attributed to the tuber of a plant which they called *orchis*, the exact botanical origin of which is still in question but which was unquestionably one of the *Orchideæ*. These tubers suggested to the Greeks a resemblance to the testes, and, in fact, the Greek word orchis means a testicle. Hence, because of this similarity in form it must be a powerful aphrodisiac. Pliny has preserved for us some account of this plant and its supposed virtues. He writes in his *Historia naturalis:*

"*The Orchis or Serapias:* There are few plants of as marvellous a nature as the *Orchis* or *serapias*, a vegetable production with leaves like those of a leek, a stem a palm in height, a purple flower and a two-fold root formed of tuberosities which resemble the testes in appearance. The larger of these tuberosities or, as some say, the harder of the two, taken in water, is provocative of lust; while the smaller, or in other words, the softer one, taken in goat's milk, acts as an antaphrodisiac."

And further:

"The *Cynosorchis*, by some called *Orchis*, has leaves like those of the olive, soft, three in number, half a foot in length and lying upon the ground. The root is bulbous, oblong and divided into two portions, the upper one hard and the lower one soft. These roots are either boiled like bulbs (of onions) and are mostly found growing in vineyards; if males eat the upper part they will be parents of male issue, they say, and females, if they eat the lower part, of females. In Thessaly the men take the soft portion in goat's milk as an aphrodisiac and the hard part as an antaphrodisiac. Of these parts the one effectually neutralizes the action of the other."

The statement regarding the Thessalians occurs also in Theophrastus in his account of the *Cynosorchis*.

The botanist Tabernaemontanus, whose famous Herbal was published in 1613, at Frankfort, gives some interesting details regarding the *Orchis*, supporting his statements by the authority of the ancients. He tells us that in his own time the tubers were used as a food, but few people being acquainted with their virtues as a remedy for impotence; or, as he expresses it, "for decayed men who have lost all boldness with women," and he quotes Galen to the effect that the tuber "possesses a high degree of moisture, wherefore, if eaten, it excites to the conjugal duties and helps the old weak man upon his feet." He cites Dioscorides as authority for the assertion, found also in Pliny, regarding the eating of the upper and lower tubers by men and women, respectively, and the ensuing consequences. Regarding the administration of the drug he says: "It is used in various ways; some drink it in good wine, some mix it with their food while others take it in the form of a jam; others, bake it in the form of a cake and give this to eat." He offers some suggestions of his own for making the drug more palatable, recommending the addition of honey and a small quantity of pepper and forming the whole into an electuary; or he would have you take one loth of the tuber, a quintal of a root called *Haschwurtz* and a scruple of long pepper, which are to be incorporated with honey and the mixture to be taken by the patient upon his going to bed. The small, shrivelled tuber he recommends to the virgins of the cloister, for it allays effectually all erotic desires and dreams of connubial felicity. Tabernaemontanus also informs us that according to Northern mythology the giantess Brana administered to her favorite Halfdam *Broenngras* in order to obtain his

love and that the goddess Freya similarly employed *Freyagras*, both plants being species of *Orchis*.

All these beliefs were more or less isolated and referred to certain plants only the action of which had been learned from common experience. It was left to the bold genius of Paracelsus to furnish a principle which should apply to all medicinal plants and thus make him the author of what is specifically known as the "Doctrine of Signatures." Underlying his theory was the broad postulate of the parallelism of the microcosm and the macrocosm, a postulate which dates back to the times of the Babylonians. What is above is like that which is below, and harmony between them is assured by the perpetual activity of a supreme being, God. The existence of all things from the greatest to the most minute is thus dependent upon this ultimate source. Material things derive from a principle lower in the hierarchy of being, a primordial substance which he calls Yliaster; besides this primordial substance there is an activity or vital essence which sets them in motion and preserves them in this state—the *Archæus*. This *Archæus* is encapsuled, so to speak, in an invisible medium designated *Mumia*, when it enters the human body, and in disease this *Mumia* must be acted upon by the *Arcana* or spiritual essence of drugs, it being the most important function of chemistry to determine the magical powers of these arcana. In accordance with the central doctrine of Macrocosm and Microcosm and the goodness of God, there must exist for every disease a specific—medicinal plants were created for the express purpose of healing disease. Hence the well-known aphorism of Paracelsus: *Die ganze Welt ist eine Apotheke.*

By what indications is man to be guided in selecting the plant proper to a given disease? Paracelsus answers: By its physical characteristics, that is to say, its form, its color, taste, odor, etc. Its form is of prime importance, for the resemblance of its parts to the organs of the human body, in so far as form is concerned, is an unfailing guide. "The properties of forces and of plants," he says, "are not to be learned from Dioscorides and Macer, but from the *signatura* which Nature has impressed upon every vegetable product." In his *Labyrinthus medicorum*, published in 1564, he says: "Seeing that all bodies have form in which they exist, so form indicates the medicinal virtue which is in them;" and he goes on: "Therefore, if it (the plant organ) has the form of the feet, it applies to the feet, if of the hand, to the hand; similarly with the head, back, belly, heart, spleen, liver, etc." "Everything that Nature bears she forms according to the nature of its virtues." "The virtue is therefore manifested by the form, figure, body and substance; thus, these make clear the essence, for the virtue and the form are alike in the same degree, so that through the form the virtue is understood and through the virtue the form." There is a subtle thought latent in the last sentence. Expressed in modern terminology it is, that structure is the complete expression of function.

In illustration of his contention Paracelsus cites a number of examples. Thus *Wundkraut* (*Polygonum Persicaria*) Wound Herb, so called because of the red spots on its leaves, heals wounds; St. John's Wort with its "punctured" leaves is a remedy to be used in the treatment of wounds caused by stabbing; *Orchis* tubers are anaphrodisiac, in consonance with tradition; thistles are good for

piercing pains in the body; the shield-like tissues of *Alium victoralis* suggest that it is useful in warding off felonious attacks upon the person, and so on.

Paracelsus even went so far as to propose an altogether new system of therapeutic nomenclature, which was to consist in substituting for the names of diseases those of the plants which were efficacious in combating them. "A true physician," he writes in the *Paragranum*, "says: 'this is *morbus terebinthinus*, this is *morbus Sileris montani*, this is *morbus helleborinus*, etc., and not: this is *bronchus*, this is *rheuma*, this is *catarrhus*, this is *coryza*.'" Taste and color are also of importance in his eyes and in interpreting these he gives his fancy free rein.

That versatile genius, Giambattista della Porta, physicist, physiognomist, occultist and playwright, carried the views of Paracelsus still further, in his remarkable work entitled *Phytognomia*. Unlike Paracelsus, whose contempt for the Ancients is well known, he respected them. Saturated with the spirit of occultism he was not content with the general philosophical speculations of Paracelsus; he sought to penetrate into the occult properties of the plants themselves, and announced his supposed discoveries in terms that led to the complete mystification of his readers; these he associated with their form, color, etc., achieving the same end as did Paracelsus. Thus, he maintained, yellow flowers and yellow plant juices act upon a yellow bile, dark colored ones upon the black; plants with a scorpiod inflorescence are recommended against the effects of a scorpion's bite; certain plants with flowers suggesting the forms of insects are good for insect bites. He also proposed a system of taxonomy based upon the resemblance of the more important parts of plants to the organs of man and other animals, whereby he arrives at classifications grotesque enough. He also considers the moral qualities of plants; thus there are merry ones, melancholy ones, sedate ones, sympathetic ones and so on through the gamut of the affections; these qualities are also used in his system of classification and, of course, they play a momentous rôle in his therapeutics.

The step from the doctrine of signatures to astrology is a short one. Both were combined after the way had been made clear for the one. Indeed, the fusion is inevitable, for both are corollaries from the theory of the microcosm. It is unnecessary to enumerate the writers who made them the basis of their speculations. Two men stand out as typical of the attitude—Bartholomæus Carrichter and Johann Christian Schroeder. Carrichter published toward the end of the sixteenth century an herbal in which he went into much detail regarding the proper time for collecting and preparing medicinal plants, these times being, of course, those when the constellations were favorable. Schroeder is of a later period having been born in Salzuffeln in 1600 and dying in Frankfort as town-physician in 1664. He had studied medicine and the natural sciences—the two went together at that time—in Germany and Italy. He was an ardent Signaturist, and described a huge number of drugs valuable in his eyes because of their resemblance to features of the human body in one respect or other. Schroeder is a person of mark in the history of pharmacy, his reputation resting on a *Pharmacopœia-medico-chymica*, which first saw the light at Ulm in 1641 and passed through many editions; it was printed in the Latin, and a translation was made into German by J. N. Mueller as late as 1717. It was a stock manual for apothecaries until the middle of the eighteenth century. Schroeder describes medicinal substances derived

from all the kingdoms of nature and discusses their properties and action from Hermetic-Hippocratic principles, as is stated on the title page. The work is divided into five parts: in the first, medicinal plants are classified on an astrological basis. The sun, we are told among other things, is the "planet benevolent," and within his domain are numerous plants, these being all the *aromatics, acetosa, acetocella, borage, calendula, chelidonium, cetraria, crocus, dictamus, fraxinus, gentian, granatus, helonium, hypericum, lavandula, laurus, majorana, malva, rosmarinus, poma aurantia, poma citria;* thus, mastiche, myrrh and there are others falling within the influence of the moon, the planets, and various stars and constellations. In the second part of the work are given the proper times for collection, this being the practical application of the assertions contained in the first.

As a scientific discipline the doctrine of signatures was dead in the early part of the eighteenth century, although it continued its vogue among the peasant class and, indeed, survives there to this day. An attempt was made to revive it—as Tschirch says "to warm it up"—by Johann Gottfried Rademacher of the tincture fame, in 1841, when he published his "Verstandesrechte Erfahrungsheilkunde," and it found a number of supporters among physicians on the ragged edge of medicine; I believe that there are some who have not rejected the Rademacher cult even at the present day. Traces of it may be latent in the Hahnemannian postulate of *similia similibus*, though that also is on the decline. It is not at all unlikely that it may find a quasi-rejuvenation in these days of ours when the most fantastic of medical cults are finding converts. The time is ripe for it as it is for another Cagliostro. "The more civilization advances," says Voltaire, "the more noise does superstition make." There are indeed strange portents in the sky. Astrology is with us in as healthy a state as it ever displayed—see the daily horoscopes published in the newspapers. Let somebody take a bifurcated radish and make a good sales talk to an emotionally sympathetic congregation, and the trick is done.

The doctrine of Signatures reminds of the words of Mephistopheles:

> "Ich bin ein Teil von jener Kraft
> Die stets das Böse will and stets das Gute schafft."

Not that its advocates desired to work evil—on the contrary; theirs was not the spirit of negation; but they followed the path that leads not to truth. The good they accomplished was adventitious and did not fall within the province of their dreams. The search for likenesses led to a close scrutiny of the characteristics of plants, and thus furnished a vast amount of material for descriptive and ultimately for systematic botany. And the search for *arcana* has not been fruitless. In many instances they have been found; but they have not revealed themselves as spiritual essences, rather in the form of active principles. One dream of Paracelsus has thus been in a sense realized. As to the fundamental proposition of the doctrine of signatures, modern pharmacologic chemistry, in seeking to deduce the relation between molecular groupings and physiological action of compounds, tacitly accepts the postulate which Paracelsus dimly sensed—that structure is the complete expression of function.

THE DEPARTMENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

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CONVENTION ANNOUNCEMENT.

The twenty-fifth annual convention of the National Association of Boards of Pharmacy—Silver Anniversary—will be held at Portland, Maine, Monday and Tuesday, August 20th and 21st, with the Eastland Hotel as headquarters.

Edgar F. Carswell, secretary of the Maine Board of Pharmacy, is Local Secretary for the American Pharmaceutical Association and is in charge of all arrangements. His address is 10 Main St., Gorham, Maine. Make hotel reservations by writing either Mr. Carswell or the N. A. B. P. secretary's office.

Boards are urged to elect their delegates just as soon as possible and notify the N. A. B. P. on the credential forms mailed to all board secretaries.

At the joint session of the colleges and the boards on Tuesday morning, August 21st, a definite plan for proceeding with the college survey will be adopted. Since the N. A. B. P. started this work, it is very important that a good representation be present at this meeting. The opening session of the N. A. B. P. will be held Monday morning, August 20th, at 9:00 A.M.; the second session on Monday afternoon, and the final session Tuesday afternoon at 2:30.

This, our silver anniversary, is an important mile post in the annals of the N. A. B. P. You should arrange to be present.

OBITUARIES.

Harry W. Crooks, a member of the New Jersey Board of Pharmacy for nearly ten years, died suddenly on April 28, 1928. He was fifty-five years of age and had been very active in the New Jersey Pharmaceutical Association, having served that body as President and a member of the Committee on Legislation. On the Board of Pharmacy, he had also served as President and Vice-President during his term of membership. Nor was his sphere of activity in pharmacy limited to his own state. He took an interest in national affairs, and as delegate to the N. A. B. P.

District No. 2 meeting held at Baltimore, March 5th and 6th, this year, he took an active part in the discussions of the conference. His untimely death leaves a vacancy that it will be most difficult to fill.

Byron M. Hyde of Rochester, New York, President of the New York Board of Pharmacy, died at Miami, Florida, on March 28th. He was in his seventy-second year and had been a prominent and successful retail pharmacist in Rochester from 1891 until the time of his retirement from business some years ago. He was a well-known leader in pharmaceutical circles and one of the original group which organized the United Drug Company. He leaves behind him a record of a useful life, dedicated to the upbuilding of his chosen profession—pharmacy.

STATE BOARD NEWS.

(CULLED FROM MANY SOURCES.)

Alabama.—The Alabama Board members can be paged aboard the steamship "City of Birmingham" leaving Savannah on June 9th, bound for New York. How come? The State pharmaceutical association is holding its annual convention on the Atlantic Ocean and expects to finish up with a good time in New York City.

Arizona.—Examination classes are constantly growing larger, the April class having exceeded all previous records. Of the 76 who took the examination, 39 obtained "registered pharmacist" certificates, 24 "assistant" certificates and 13 failed completely. North Dakota, Nebraska, Colorado, Texas, South Dakota and California were represented among the candidates. Five women took the examination.

Ten applicants were granted reciprocal registration at the April meeting: Claude J. Sharp, of Arkansas; Albert R. Halstead, of Colorado; Julius Sucherman, of Illinois; Arthur E. Hummell and William A. Brown, both of Indiana; Hazel M. Chilton, of Nebraska; Marie A. Wahl, of New Jersey; Horace McMichael, of Tennessee; Benjamin E. Smith, of Texas; Edward S. Howard, of Washington.

The business meeting following the examination was held at the home of Dr. J. A. Dines in Tempe, as he has been in poor health and unable to make the trip to the Capitol. The members presented him with a beautiful pipe set in honor of his eighty-third birthday.

May marked the twenty-fifth year that Arthur G. Hulett has been serving as secretary of the Arizona Board.

Arkansas.—Herbert W. Parker of Jonesboro, has been re-appointed as a member of the Board for another five-year term dating from May 1, 1928.

Florida.—The semi-annual examination meeting of the Board was held at Ocala, Fla., on June 11th and 12th. Results will be announced later.

Indiana.—Charles E. Reed of Winchester, and John A. J. Funk of Galveston, have both been re-appointed by Governor Jackson for four-year terms on the Board of Pharmacy. Mr. Funk is N. A. B. P. vice-president and chairman of District No. 3.

At the annual meeting of the Board, Fred W. Meissner of La Porte was elected president for the ensuing year and Russell B. Rothrock of Mt. Vernon was elected Secretary.

Kentucky.—At the meeting of the Kentucky Board of Pharmacy held in Hopkinsville, April 10th, a class of 17 candidates for "registered pharmacist" and 7 for "assistant" was examined. Of these, ten were successful in passing for the "registered pharmacist" license and three for the "assistant."

The following qualified for reciprocal registration: J. Calvin Fouts, of West Virginia; George B. Byrum, of Indiana; S. J. Hargrove, of Georgia; Edwin H. Meyers, of Ohio.

At this meeting Edward Bloomfield, who has been the attorney and inspector for the Board for more than twenty years, tendered his resignation, which was accepted with expressions of regret.

To supply the vacancy caused by Mr. Bloomfield's resignation as inspector, the services of C. S. Porter were secured. Mr. Porter some years ago served several terms as a member of

the Board of Pharmacy, after which he acted as drug inspector for the State Board of Health for many years.

The next meeting of the Board will be held in Louisville, July 10th.

The Board is sending out a notice to the effect that after the July meeting all applicants for examination for registered pharmacist will be required to show evidence of having successfully completed three collegiate years at a college of pharmacy recognized by the Kentucky Board. This provision will not apply to those who may heretofore have taken the examination and failed and who desire to again appear before the Board. The former requirement was two years of college, and this change was made to put Kentucky on the three-year college basis the same as other states now that the first three-year graduates are appearing.

Louisiana.—Edward H. Walsdorf, president of the Louisiana Board and an ex-president of the N. A. B. P., recently signed a fifteen-year lease with a total consideration of about $200,000, for a second store on Canal Street, New Orleans. The new store is to be in the La Salle Hotel building and should be ready soon. His two sons, Edward H., Jr., and H. M. Walsdorf, will be associated with him.

Massachusetts.—Of the 52 candidates who took the February examinations, twenty were successful in obtaining pharmacists' licenses.

Michigan.—The Board of Pharmacy elected Garfield M. Benedict, Sanilac county clerk, as director of the State Pharmacy department to succeed H. H. Hoffman, resigned.

J. E. Richardson, a well-known pharmacist of Detroit, has been appointed a member of the Board by Governor Green to succeed Alexander Reid, resigned.

Minnesota.—In accordance with the provision of the pharmacy law, the Minnesota State Pharmaceutical Association has presented the following nominees for the State Board of Pharmacy vacancy to Governor Christianson, with the request that one of these be appointed to serve on the Board: Hugo O. Peterson of Minneapolis; C. A. Anderson, Litchfield; H. O. Tiegen, Moorhead; R. J. Messing, St. Paul; F. W. Moudry, Minneapolis.

Mississippi.—The Governor recently appointed a new Board of Pharmacy as follows: D. E. Nabors, Indianola; M. K. Patterson, Jackson; D. M. Perkins, Corinth; J. S. Puller, Starkville; Lew Wallace, Laurel. D. E. Nabors was elected president and M. K. Patterson as secretary when the organization meeting was held. J. S. Puller was re-appointed, having served on the former Board.

Montana.—Secretary J. A. Riedel recently sold his store in Boulder and has moved to his new home in Billings.

Nebraska.—The Nebraska Department of Public Welfare announces an examination in pharmacy, June 18th to 21st, inclusive, at the Creighton College of Pharmacy, Omaha. The law requires that all applications must be on file with the Department fifteen days in advance.

New Mexico.—An examination meeting was held in the Franciscan Hotel, Albuquerque on May 21st. Among the 50 aspirants, Oklahoma, Arkansas, Kansas, Texas, Colorado and Utah, were represented.

After the examination, the Albuquerque druggists and the Board met and organized a state pharmaceutical association.

North Carolina.—An examination meeting was held at Chapel Hill on June 12th—the results will be published in the next issue.

At that meeting, it was also decided to employ an all-time inspector to visit and inspect every drug store in the state.

North Dakota.—The appointment of Louis Rosoff, of Grand Forks, by Governor Sorlie, as a member of the North Dakota Pharmacy Board, was upheld by Judge A. T. Cole, in the district court recently. The state association contested Rosoff's appointment and the board refused to seat him on the ground that it was mandatory on the governor to appoint a man from the list submitted by the North Dakota Pharmaceutical Association.

The section of the law, interpretation of which is questioned, reads, "The members of said board *shall* be appointed by the governor upon recommendation of the North Dakota Pharmaceutical Association."

Judge Cole in his decision says:

> "The contention that the governor must appoint upon the recommendation of the members of the association, would deprive the governor entirely from exercis-

ing any judgment in the matter and would make of him not a consulting power even, but a mere figurehead. No such purpose should be interpreted into any statute unless the language is so specific and unambiguous that it cannot be avoided."

The State Association has taken an appeal from the decision of the district court. This will bring about a final review by the State Supreme Court and end the controversy for all time.

Ohio.—The Board conducted an examination in Columbus on April 3rd and 4th, and 44 of the 81 "pharmacist" candidates were successful. On the "assistant" examination, 18 of the 29 candidates passed.

The highest grade obtained in the "pharmacist" examination was 91.8% by Wynford M. Riggs, of Newport, Ky. The highest grade obtained in the "assistant" examination was 93%, by Lester E. Max, of Piqua, Ohio.

The next examination will be held in Columbus, June 19th, 20th and 21st.

Oregon.—The Board elected the following officers at a recent meeting: *President*, Rocky E. Mason; *Treasurer*, W. Hal McNair; *Secretary*, Frank S. Ward (reëlected).

Mrs. Lulu Sherman, who has been secretary to Mr. Ward for four years, was promoted to *Assistant Secretary* in recognition of her faithful and efficient service.

Joe Dagnaise, of Montana, was granted reciprocal registration.

The results of the examination held on June 5th–8th, have not as yet been published.

Pennsylvania.—The results of the April examinations show 52 candidates out of a class of 107 received "pharmacist" license and 77 out of a class of 183 received "assistant" registration.

Rhode Island.—A bill has been introduced in the Legislature by Rep. Fletcher W. Lawton, of Newport, which provides that every store selling extracts, flavorings and patent medicines in original packages put up by licensed pharmacists, whose name and address appears on such package, must obtain a license from the Board of Pharmacy and pay an annual fee of $10. The aim is to give the Board of Pharmacy control over the sale of such products.

Texas.—W. H. Cousins, secretary of the Texas Board, has the honor of being the first to use airplane transportation in attending a district meeting, and District No. 6 can well be proud of the distinction conferred upon it thereby. Instead of meekly accepting a train as the mode of travel, Cuz flew back from Hot Springs to Little Rock by airplane, not without many modest protests on his part though, as he explains in his article "A Ramble in the Clouds" in the May issue of the *Southern Pharmaceutical Journal*. True to his journalistic training, Cuz spent the time in the air devising headlines for the morning papers such as, "Well-Known Aviator and Passenger Fall to Death in Edge of Ozarks," and "Passenger Believed to Be Dallas Man; Bodies Removed from Wreckage of Burned Plane." But all to no avail, as the plane did not fall!

Virginia.—The Board of Pharmacy met in Richmond and held examinations in the Medical College of Virginia on Wednesday and Thursday, May 30th and 31st. There were 23 applicants for the "registered pharmacist" certificate and 33 for the "assistant" papers. Results of the examinations have not yet been announced.

A. L. I. Winne, secretary of the Virginia Board, served as chairman at the District No. 5 meeting held in Bristol, Va.-Tenn., in April. Chairman Lyle was unable to be there owing to illness. Delegates from North Carolina, Virginia and West Virginia Boards of Pharmacy were present as well as representatives from the following colleges: University of North Carolina, Medical College of Virginia, Meharry School of Pharmacy and the University of Tennessee.

Four years of high school work as a prerequisite for the "assistant" examination becomes effective in Virginia on July 1, 1928. The present requirement is two years.

The annual report of the Board shows 36 candidates as having taken examination for registration as "pharmacist" during the year. Of these, thirty were successful and six failed. Eighteen pharmacists registered by reciprocity during the year.

Make your preparations to attend the Convention in Portland, Maine, during the week of August 20th.—See your R.R. agent for Convention and Summer rates.

THE PHARMACIST AND THE LAW

BY HOWARD KIRK,* EDITOR OF THIS DEPARTMENT.

"Nor shall any person publish any advertisement whatsoever, which shall be false or misleading in any particular." Such is the wording of a recent State Law, marking an new epoch in the progress of business.

Few of us realize how strongly and how frequently during recent years the doctrine of honesty in business has been preached by the courts, by legislatures, and other Government agencies. There was a time when the slogan "Business is Business" served as a cloak to condone every kind of trickery that did not actually lead to the penitentiary. To-day, however, an aroused public conscience is demanding new standards.

All lines of business have felt the impress of the enforcement of these new standards of honesty. An examination of recent decisions of the Federal Trade Commission shows the following:

A storekeeper caused certain fountain pens on sale at his place to be marked with fictitious prices, when in fact the pens sold for about half of such marked price. This conveyed the idea to the public that the pens were being sold at a greatly reduced figure. The dealer was compelled to mark the true sale price on his pens.

A correspondence school was advertising "an amazing 20-day offer," during which time prospective students could receive their course at a reduction of $17.50. The fact was that the 20-day limit was not observed, and that all courses cost $42.50 and no reduction actually was made. The Commission compelled the school to discontinue such advertising.

A granite selling concern used as a part of its trade name, the name of a State or district renowned for its granite quarries. In truth, the firm did not own, control or operate any quarry located in such district. They were compelled to discontinue the use of this form of unfair advertising.

The Commission recently paid its respects to the fur trade. As a result, rabbit fur may no longer be sold as "Squirreline," without acquainting purchasers with its true origin; and names used must show exactly the nature of the finished product, such as "seal-dyed muskrat," "mink-dyed marmot," or "pointed fox." Other decisions affected the clothing manufacturers. They were prohibited from using the word "wool" or "serge" to describe clothing not made wholly from wool. A firm was enjoined from advertising "seamless" hosiery when the term, as ordinarily understood, was in fact untrue. In another case the use of the word "linseed" was forbidden to describe a product not wholly made of linseed oil.

In this crusade for honesty and fair dealing, the drug trade seems to have gotten off with a premonitory letter. The drug control office of the Department of Agriculture has administered the following warning, concerning the labeling of drug supplies:

"The word 'label' has been interpreted by the courts to cover any printed matter that accompanies the package..... In a labeling the manufacturer should avoid any suggestion, hint, or insinuation, direct or indirect, by statement, design or device, that may tend to convey a misleading impression in any particular, and also any unwarranted representations that are indefinite or of a general sweeping character."

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* Member of the Philadelphia Bar, and Lecturer on Pharmaceutical Jurisprudence at the Philadelphia College of Pharmacy and Science.

In a word, the Department says that the wording of the label must be strictly in accord with the facts.

The drug manufacturer is held to the highest responsibility for absolute truth, if he makes statements on a label concerning the cure which the drug so labeled will effect:

"Care must be taken that on the labeling appears no misrepresentation, expressed or implied, as to the therapeutic effect of the product. In making statements of therapeutic efficacy on a label the manufacturer assumes the position of one having a *special knowledge of disease and its treatment*, and the United States Supreme Court has ruled that he can be held accountable accordingly. Under the law he is responsible for his statements or representations, and no one can relieve him of this responsibility. Personal belief, testimonials in general, dispensatories, scattered isolated excerpts from medical publications, obsolete medical books, and discarded medical practices are not adequate authorities for therapeutic claims; the consensus of present-day medical opinion is the standard which should guide manufacturers in labeling. A preparation cannot properly bear promises of benefit unless as a matter of fact it can be reasonably depended upon to produce the results claimed for it..... Regardless of whether the product is recommended as a 'cure,' 'remedy,' 'relief,' 'useful in the treatment of,' 'indicated for' or simply 'for' certain diseases, the question is whether or not the product in itself, by reason of the contained ingredients, constitutes a treatment for the disorders named..... Names of organs or portions of the body should not appear upon a labeling unless the product can properly be considered a treatment for *any and all disorders* to which such organs or parts may be subject."

The drug manufacturer furthermore is held to full responsibility for the truth of statements made in testimonials:

"When the manufacturer publishes a testimonial to the effect that his medicine has produced certain results, he conveys to others the promise of a similar benefit, and *he must assume the responsibility for all therapeutic claims* made in this manner to the same extent that he does for promises to benefit made in his own words. The fact that the testimonial may be bona fide and accurately quoted does not relieve him of this responsibility."

The Supreme Court of the United States naturally has the final word. In United States v. 95 Barrels, etc., a recent case, this court stated its opinion with regard to deceptive labeling or advertising:

"Deception may result from the use of statements not technically false or which may be literally true. The aim of the statute (the Pure Food and Drug Law) is to prevent that resulting from indirection and ambiguity, as well as from statements which are false. It is not difficult to choose statements, designs and devices which will not deceive."

The signs are good. It has always been considered the function of Government to deal with crime. But there are many wrongful acts which, although they fall short of being actually criminal, yet do untold harm. It is good to know that the American people are beginning to deal with just such acts, and to insist on the maintenance of rules of fair play in business, so that the honest merchant may have an even chance with his less scrupulous competitor in the development of a profitable and successful business.

SACRIFICES FOR HUMANITY.

Word was received in London, May 30th, of the death of Dr. William Alexander Young, director of the Gold Coast Medical Yellow Fever Research Institute at Acera. He was a co-worker of Dr. Hideyo Noguchi, internationally known bacteriologist, who died recently, and thus two more names are added to the list of distinguished scientific martyrs.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS DEPARTMENT.

A BASIS FOR AGREEMENT ON A STANDARD THREE-YEAR CURRICULUM.*

BY WILLIAM J. HUSA.

One of the outstanding unsolved questions of the day in the field of pharmacy is the question of what constitutes a standard three-year course in pharmacy. In spite of the efforts of college faculties, state boards of pharmacy and the various associations, there is still a great uncertainty as to what subjects and how much of each should be included in the three-year course. A satisfactory answer to the question would be of great value to college faculties in arranging their curricula, and would give the boards of pharmacy a measuring stick by which they could evaluate the course of study and determine whether the curriculum of a given college is up to standard.

In the problem of securing agreement between the colleges and boards on a standard three-year course, it is evident that differences in individual opinion preclude the possibility of securing complete agreement on what subjects and how much of each should be included. On the other hand, the present requirements of the A. A. C. P. allow too much latitude, since they merely provide "that the college shall require of each candidate for graduation not less than 2250 hours of instruction, of which at least 1000 hours shall consist of lectures and recitations, such work to be given in a period of not less than three full college years of at least thirty weeks each . . . ." Likewise the "Pharmaceutical Syllabus," valuable as it is, in its present form is not suitable for adoption as a standard because it contains a statement "that any school is at liberty to modify it by substituting other subjects for those included in the outline" and no limit is set on the amount of substitution that may be made.

The above rough standards were satisfactory as a beginning, but the time has arrived when more explicit and more definite standards are desirable. I would suggest that the desired results may be achieved by definitely specifying 80% or 1800 hours of the course, leaving 20%, or 450 hours to the discretion of the faculty of each individual college. By having 80% of the course uniform as to subjects and hours in all the colleges, the necessary degree of uniformity would be obtained, thus assuring fundamental soundness of the course. The 20% leeway would allow for differences in the purposes, ideals and local conditions of the individual colleges. It would also allow for differences in length of the school year, which commonly varies from 30 to 36 weeks.

The 20% leeway of courses not specified gives each college an opportunity to increase the time allotted to the various courses and to add a limited number of courses not mentioned. Further latitude is available from the fact that it is

* Presented before the Section on Education and Legislation, A. PH. A., St. Louis meeting, 1927.

quite practical in most cases to give more than the minimum of 2250 hours in a three-year course. However, there is danger that too much matter may be crowded into the curriculum. Thus some colleges give more than 3000 hours of instruction in three years. This, I believe, is a mistake. The student is thus forced to attempt too much, with resulting drop in quality of work done. For this reason I suggest an upper limit, say 2800 hours, above which no college will be allowed to go without losing its standing. There is a limit to the amount of studying a young person can do, and it is folly to pile on hours upon hours until the capacity of the average student is far exceeded.

To be of value, a standard curriculum must meet with the approval of the boards, colleges and pharmacists in general. These diverse groups could hardly be expected to agree completely on what subjects and how much of each should be included in the three-year course. However, complete agreement on 80% of the minimum course is a goal which is not impossible, in fact, I believe it is one we can reasonably hope to attain.

COLLEGE OF PHARMACY,
UNIVERSITY OF FLORIDA,
GAINESVILLE, FLA.

NEED OF FINANCIAL SUPPORT FOR COMMERCIAL EDUCATION IN PHARMACY.*

BY C. B. JORDAN.

In the development of education certain professions were given preference. Ministry, Law and Medicine were early looked upon as learned professions and a liberal education as represented by Arts and Science was also classed as worthy of the attention of promising students. All other courses were considered non-professional or utilitarian and therefore unworthy of the élite. It has required many years to break down our old prejudices and to open the professional or ethical doors to other lines of education. Gradually we have come to look upon Dentistry, Engineering, Pharmacy, Home Economics, Agriculture, Journalism, etc., as professional. The latest endeavor to knock at the professional door is Commercial education.

Commerce is as old as the human race because man began to exchange, barter, buy and sell as soon as he had an excess of one product and a deficiency of another. It seems strange that a trade as old as Commerce, the oldest of all trades, should be so slow in seeking recognition as an ethical endeavor. I believe that this can be explained by the fact that, until comparatively recently, no scientific study of commerce was made. Each man who engaged in it learned his lessons in the hard school of experience and his success or failure depended in a great measure upon whether dame luck cared to smile upon him or not.

I am glad to say that that day is past and that we are giving careful, earnest thought and study to determine the best business methods. We are also spending great sums in a scientific study of business to the end that many of the pitfalls may be avoided and that we may have fewer failures.

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* Section on Commercial Interests, A. PH. A., St. Louis meeting, 1927.

"Commercial Pharmacy" is only now coming into its own. It is true that some pharmaceutical educators still look upon it as unworthy of their earnest thought because it, in their estimation, is non-professional or unethical. These men will soon have to change their viewpoint or they will find themselves with the hopeless minority.

Since "Commercial Pharmacy" is the last to demand and secure attention from the executives of colleges of pharmacy, it is but natural that it should be limited in its financial support. Our colleges of pharmacy are poorly supported at best and the addition of a new line of work takes from the support of the college and must itself be inadequately financed. It seems to me that we must look for a new source of income if "Commercial Pharmacy" is to be adequately supported.

"Commercial Pharmacy" is only in its infancy and a great deal of research and scientific study must be given to it before we can expect results that are satisfactory. It is true our colleges of pharmacy are endeavoring to teach this subject by a three- or four-hour lecture course for one or two semesters. I am sure that no one will contend that this is adequate for the importance of the subject. Our colleges are doing no more because they are not financially able to do more. It will require considerable sums of money properly to finance a college to do the necessary research and development to place this newest educational endeavor upon a par with other lines of pharmaceutical education.

We are lacking in trained teachers to begin with and these teachers must secure their training, in addition to pharmaceutical training, in expensive Business Colleges, therefore they will demand higher salaries than are being paid to teachers of other subjects. Research and methods of development and also equipment must be paid for if we are to conduct courses worthy of the name of pharmaceutical education. All of this will cost our colleges considerable sums of money and this money must be secured from new sources.

If we are to teach "Commercial Pharmacy" in an efficient manner, we must first know what to teach, especially the fundamentals of good business practice. It is true that a great deal has been written and spoken regarding these fundamentals. However, most of this is based upon opinion secured from experience in business or upon a more or less superficial study of business. Some of our business colleges have conducted researches into restricted lines of business but the business of Pharmacy has not been the subject of any extended study. I am pleased to recognize the splendid efforts that the National Association of Wholesale Druggists is putting into this most important task and I am sure that out of their efforts much benefit will come. However, the colleges of pharmacy should contribute their share and we all recognize that there is plenty of work for all, even if the number of associations, colleges and interested individuals were multiplied by two.

I have a vision, a dream of *service*, that colleges of pharmacy could render to the pharmacists of this country. I recognize that it is only a vision but I believe enough in its possibilities to have the courage to express it at this time.

We are all aware of the great service that the Agricultural Colleges of America are rendering to the farmers to-day. It has required years to perfect this service and to develop an organization in each state that reaches out and touches every

agricultural interest. It is almost impossible for us fully to comprehend the tremendous value this service is to the farmers and to all the people.

Within the past few years our colleges, especially our Land Grant institutions, have extended this service to the industries of the state and we find them holding group meetings with factory superintendents, with tradesmen and with every group in the great industrial world. We find them conducting short courses attended by the representatives of the various industries. They also reach out to the smaller communities in sociological service, in home economics, etc. The splendid response these workers receive attests the great value to the group served. Again it is difficult for us to grasp the great amount of service thus rendered.

Are not these examples of service rendered to the different interests of our communities an inspiration and are they not examples worthy of following? If the Colleges of Pharmacy could command sufficient funds to employ a thoroughly trained teacher to take charge of instruction in commercial pharmacy and also to be available for service to every retail druggist who might wish to seek such service, I believe it would be a very worthy undertaking. When I say a thoroughly trained teacher, I mean one who has had the best collegiate business training plus the best possible practical experience in retail pharmacy. Such a person would be invaluable as a teacher in the college and could also become invaluable to the druggists of the state, at least to those who would care to call upon him for assistance in analyzing their business and in perfecting the most efficient organization compatible with local conditions.

If such a vision is to be realized, it will require considerable sums of money beyond that which our colleges have at their disposal now. Where can we look for a source of revenue that will enable the colleges to render such a service?

Perhaps we can profit by the experience of other commercial colleges. Among the outstanding commercial colleges may be classed the Graduate School of Business of Harvard University and the Babson Institute. I speak of these two, not to give them preference, but because I am partially familiar with their sources of finance. Mr. George Baker of Standard Oil Co. gave the Harvard Graduate School of Business $5,000,000 and added another $1,000,000 on the day it was dedicated. It was also the recipient of another $1,000,000 on dedication day. The Babson Institute was organized by Mr. Babson of statistical fame and we can readily believe that he contributed generously to its finances.

Commercial education in pharmacy is not in need of any such sums as I have just quoted but smaller amounts could very well be used to build up our courses and to extend the usefulness of our colleges. It is to be hoped that a source of financial support, perhaps some Baker or Babson, may be forthcoming.

MOSQUITOES.

BY THE UNITED STATES PUBLIC HEALTH SERVICE.

It is important that every pharmacist shoud know something of the rôle played by insects in the spread of disease. In the last article the fly as a carrier of disease was discussed and explained. The purpose of the present article is to tell something about another insect which is a menace to health, namely the mos-

quito, particularly that mosquito belonging to the genus *Anopheles*, commonly known as the malarial mosquito.

Mosquitoes differ greatly in their habits. Some species of mosquitoes are most commonly found near the home of man. These species are almost exclusively found close to human habitations. This is particularly true of the species commonly known as the yellow fever and dengue mosquito. Another species which may be called the wild mosquito frequents the common salt marshes such as those which are found on the Atlantic coast and seldom frequents the habitations of man. A third class, sometimes called the semi-domestic class, may be found both about human habitations and in swamps and fields. It is to this semi-domestic class of mosquitoes that the genus *Anopheles* belongs. The genus *Anopheles* is the mosquito commonly associated with the spread of malaria and known as the malarial mosquito.

In order to understand the ways and means by which mosquitoes may be eradicated and malaria prevented it is necessary to know something about the life history and habits of mosquitoes. Mosquitoes pass through four stages, the first stage, the egg or embryo; the second stage, the larva; the third, or pupa stage, and fourth the imago or adult-winged insect. The three earlier stages in the life of a mosquito are aquatic, that is, these stages are passed in water. A great many people still think that mosquitoes breed in wet grass, weeds or brushes, because they have seen the winged insects frequently resting in such places. Mosquitoes do not breed in vegetation or on the wet grass or bushes.

Mosquitoes differ not only in their habits but also in the character of their breeding places. The yellow fever mosquito and others of the first species mentioned, sometimes known as domestic mosquitoes, may be found breeding in almost any collection of water near human habitation. They have been found in old tin cans containing water, in broken bottles, in tubs and barrels, in cisterns and wells, in flower pots, in eave gutters, in stagnant roadside pools, ditches and puddles, sewers and cesspools.

The species of mosquito to which the malaria-bearing insects belong may be found breeding in partly filled water barrels, in the hoofprints of animals, in old tin cans, in hollow tree stumps and in postholes. They usually seem to prefer, however, grass-bordered pools, ditches through which water flows but slowly, the margins of lakes and streams, especially if these marginal reaches are shallow and are more or less choked with water plants and reeds which afford protection to the mosquito from small fish.

Some species of *Anopheles* breed frequently on the edges of fairly free running brooks. The wild mosquito selects a breeding place of much the same character. They are frequently found associated with the malarial bearing species, except that these breeding places are more or less remote from the homes of man, in swamps, coastal marches both fresh and salt, and in forests.

Male mosquitoes are vegetarians. The females of many species of mosquitoes have developed a taste for blood and blood has become indispensable to nearly all female mosquitoes for the development of their eggs. The female mosquito usually lays her eggs upon the surface of the water. The eggs of some species float separately on their sides. This is true of the eggs of the *Anopheles*. The eggs of other species adhere and float in the form of an irregular mass, like a small

raft. In a day or two, under ordinary conditions, the eggs hatch out into larvae, commonly known as wiggle tails. The larva is in reality an aquatic animal, but it is a true air breather. The larva of the malarial mosquito ordinarily rests and feeds at the surface of the water, it usually lies in an almost horizontal position, its tail touching the filmy surface of the water. While in this position the larva breathes through a very short breathing siphon.

The larvae of other species of mosquitoes move about more or less in search of food but at intervals of a minute or two they come to the surface of the water for air. Here, at the surface, they hang head down, attached by conical breathing tubes to the film surface. The mosquito remains in this larval stage for about a week. The length of time, however, that a mosquito remains in the larva stage varies with the species and for each species varies again with the temperature. The larvae is then transformed into a curiously shaped creature known as the pupa.

The pupa remains quietly at the surface of the water except when disturbed. It has no mouth and does not feed. It breathes through a pair of tubes shaped very much like trumpets, which project from the under side of the throat. The pupal stage lasts for two or three days, at the end of which time the adult-winged insect emerges from its pupal case through a rent near the breathing tubes.

As short a time as nine days is often all that is required for the life stages of mosquito development. Nine days from the time the eggs are laid, in many cases, the winged insect appears. The time depends upon the temperature and the abundance of food supply. Warmth favors the rapid development of the mosquito, cold retards the growth. Because of the fact, mosquitoes are much more abundant in the summer, early spring and late fall months in the temperature climates. In the tropics, wild mosquitoes become more abundant during the wet season.

Mosquitoes manage to pass through the rigors of the winter. The way in which this is done probably varies with the different species. The malarial mosquito, the *Anopheles*, hides in sheltered places, cellars, dark crannies and out-of-the-way nooks. Other species survive through the power of the larva or egg to resist cold. The larvae or eggs of some species will hatch even after they have been frozen.

Mosquitoes breed in water, in still water and in the pools and grassy edges of running water. They lay their eggs on the surface of the water. These eggs float and in a few days hatch into larvae or "wiggle tails." These live in the water and in time turn into pupae or "tumblers" which turn into mosquitoes. There are four changes in the development of mosquitoes, just as there are in the development of butterflies. For mosquitoes, all these changes must take place in water and for *Anopheles* will take from 12 to 16 days in summer weather—longer in cool weather. The larva of the malaria mosquito lies at the top of the water and parallel to it. The larvae of other mosquitoes hang from top head downward. If these hanging larvae are touched they will dive. If the *Anopheles* larvae is touched, while it may dive, it will generally scoot backward along the top of the water. They are not a particle alike and once seen, no one will ever mistake one for the other. It is important to recognize the larvae of *Anopheles*—far more important than it is to recognize the mosquitoes themselves because this enables man to find the breeding places of these mosquitoes and destroy them while in the larval stage. *Anopheles* prefer to breed in clean water in small shallow, shady

pools with grassy edges. If grass is growing in these pools, so much the better. A marshy piece of ground with small pools among bullrushes and sedges is an ideal place. The grassy edges and quiet pools formed by obstruction of small streams are also favored places as are cattle tracks. They have no objection to running water unless the current is very swift. They occasionally breed in almost any collection of water unless it is very foul—shallow wells, water barrels and tin cans, especially if these have leaves or grass in them or frog moss. Generally, however, they avoid barrels, cans and other artificial containers.

It takes usually about fourteen days for the egg to produce the mosquito. If a collection of water dries up completely in less than fourteen days it is not apt to breed mosquitoes. All mosquitoes have a bill and two palpi which lie close to the bill, one on each side. Outside the palpi are two antennae which spread apart. The antennae of the male are plume-like, those of the female are not. One can tell the male from the female because the male has plumes on his head. You can tell the *Anopheles*, malaria-bearing mosquito, from the other kinds in the United States which do not convey malaria, by looking carefully at the heads of the mosquitoes. *Anopheles* have straight bills and palpi nearly as long as their bills. The females of the other kinds have short palpi except one kind which has a curved bill. There are other differences. The malaria mosquito is slight and graceful. The wings are generally spotted or dusky.

There is still another important difference. That difference is in the way that they rest on a wall. *Anopheles* rests in a straight line, frequently standing on her head. The others rest "humped up." This is a good way to identify the adult live mosquito and is the one method usually used in practice.

Anopheles rarely bite in the day time in the United States. The day mosquito of the South is the yellow fever mosquito *Anopheles*, is shy and easily driven off and will rarely bite you when you are moving about. She is more apt to bite you when you are asleep. Her bite is less painful than that of other mosquitoes and she does not sing so loudly. On this account when mosquitoes are much complained of they are rarely *Anopheles* and there can be many *Anopheles* about without much complaint.

COMMITTEE REPORTS

AMERICAN PHARMACEUTICAL ASSOCIATION COMMITTEE ON COLORED GLASS CONTAINERS.

The May Conference.

On May 4th a conference was held in New York attended by members of committees of four national organizations; the AMERICAN PHARMACEUTICAL ASSOCIATION, the Glass Container Association, the American Drug Manufacturers' Association and the American Pharmaceutical Manufacturers' Association; to consider the problem of the deterioration of chemicals and pharmaceuticals when stored in glass containers. The conference which was presided over by Dr. H. V. Arny lasted all day when the many phases of the problem were discussed from all standpoints. The result of the conference may be summarized as follows:

(*a*). It was the opinion of the conference that research on the subject of the deterioration of chemicals and pharmaceuticals in such containers was worthy of careful research.

(*b*). A motion was passed authorizing the appointment of a committee to sound out the manufacturers of pharmaceuticals and chemicals as to the practicability of

raising $2000 to institute a research fellowship under the supervision of Dr. Arny of the A. PH. A. committee and of Dr. Ayers of the Glass Container Association to study the influence of certain colored glasses on the protection of chemicals and pharmaceuticals.

(*c*). Chairman Arny appointed as this committee, Mr. C. C. Doll of the American Pharmaceutical Manufacturers' Association, Dr. Fitzgerald Dunning of the AMERICAN PHARMACEUTICAL ASSOCIATION and Dr. John C. Krantz, Jr., of the American Drug Manufacturers' Association.

(*d*). The representatives of the Glass Container Association offered to the Conference all of the research facilities of the association; its laboratory, its physical data and such containers as will be needed to carry on the proposed research.

The following were present at the Conference:

From the AMERICAN PHARMACEUTICAL ASSOCIATION, H. V. Arny, of New York and Fitzgerald Dunning, of Baltimore.

From the Glass Container Association, S. H. Ayers, of New York and F. C. Flint, of Washington, Pa.

From the American Drug Manufacturers' Association, J. C. Krantz, Jr., of Baltimore and F. O. Taylor, of Detroit.

From the American Pharmaceutical Manufacturers' Association, C. C. Doll, of Pittsburgh and Coleman Bardos, of New York.

Guest, W. C. Taylor, of the Corning Glass Co., Corning, N. Y.

Respectfully submitted,

H. V. ARNY, *Chairman*,
115 West 68th Street,
New York City.

NEW YORK,
May, 19, 1928.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council." —Part of Chapter VI, Article VI of the By-Laws.

ARTICLE III of Chapter VII reads: "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it.* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association."

ARTICLE IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meetings of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly and manuscript should be signed by the reporter.

CHICAGO.

The 175th meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Tuesday evening, May 15th, at the University of Illinois School of Pharmacy. Dinner was served at the Hotel La Salle.

The meeting was called to order by President Gathercoal, who introduced the speaker of the evening, Dr. Geo. D. Beal, Assistant Director of Mellon Institute, Pittsburgh.

Dr. Beal gave a most interesting address on the increase in research work and its effect on various industries. He told how industries have been forced to install research departments in order to be able to meet competition, to produce more economically and to utilize waste products. He mentioned the turpentine

and rosin industry, in which careless methods giving many grades of rosin have been replaced by more exact methods.

In the glass industry by invention and research methods and equipment have become antiquated and useless against the competition. Pure science of yesterday is the applied chemistry of to-day.

He spoke of the great value of the phase rule in physical chemistry to the steel and ceramic industries.

A surplus of gun cotton induced research to find a use for it as a solvent and in quick drying lacquers. Ethyl glycoll has been found of great value as a solvent, while amyl and butyl alcohol are now being obtained from corn starch.

To increase production the baking industry has found that a mixture of malt syrup, ammonium chloride, a calcium salt and an oxidizing agent used with yeast will reduce the fermention time 50 per cent.

An over-supply of yeast stimulated research with the result that it is used as a medicine and food because of its vitamine content.

An extensive study is being made to produce a glass which will transmit the ultraviolet rays. He pointed out the need of study to determine the effect of ultraviolet light on medicinal constituents, and the use of the proper glass for the preservation of galenicals. Hydrolysis, changes in hydrogen concentration and oxidation are contributing causes for the precipitation of galenicals.

There is a great field for research in studying the effect of drying of drugs, methods of extraction and concentrating of solutions at lower temperatures. The spray-drying method is useful and might be applied to the concentration of fluidextracts. There is no doubt that oxidation and decomposition take place during the preparation of tinctures, fluidextracts, etc. Dr. Beal states that there is need of systematic, constructive research in pharmacy and excellent opportunities are being made in planning *the new headquarters building.*

A general discussion followed in which P. J. Kolb referred to the tinctures of Prof. Lloyd as being preferred by many physicians.

It was recommended by President Gathercoal that the address of Dr. Beal be accepted for publication in the JOURNAL. The motion was made and carried. Dr. Beal was given a rising vote of thanks.

S. W. MORRISON, *Secretary.*

DETROIT.

The Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION closed one of the most successful years in the history of the organization with a meeting at Ann Arbor, Thursday, May 10, 1928.

Dinner was served at the Michigan Union, which was enjoyed by more than 75 members and friends, 40 or more making the trip from Detroit.

After dinner the party joined the Prescott Club in the Pharmacy and Chemistry Building of the University of Michigan, where President Wheeler called the meeting to order.

Chairman Seltzer of the Committee on Nominations made the following report:

> The Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION, realizing the importance of association work, not only to the profession as a whole but to the individuals composing it as well, has in the past inaugurated and systematically carried out a policy of encouraging the younger members of the profession to take part in the activities and to enlist their support in the organization, the destiny of which will later on be an important factor in their own.
>
> The Committee on Nominations in order to carry out this plan more effectually proposes to place the responsibilities squarely upon the shoulders of the young men and presents the names of three, one from each of our pharmacy schools—men of high scholarship, who have taken active part and interest in our work in the past. For President and Vice-Presidents: (To be voted by ballot.)
>
> Richard A. Byce, of the University of Michigan
>
> Francis Koelzer, of the Detroit College of Pharmacy.
>
> Wilbert Parker, of the College of the City of Detroit.
>
> For the permanent officers of the Branch the names to be presented to the members to be voted upon are submitted, not for the purpose of determining who shall fill the offices, but to register our appreciation for the faithful and efficient service which they have given to make our Branch such an outstanding success:
>
> *Chairman of the Program Committee,* R. T. Lakey; *Secretary,* Bernard A.

Bialk; *Treasurer*, F. F. Ingram, Jr.; *Council of Students*, University of Michigan, J. H. Webster, Jr., and Donald Breisch; Detroit College of Pharmacy, Frank Herman and Charles Robson; College of the City of Detroit, Orville Stone and Carl Mittlestadt; *Council of Clerks*, Edward Hullon and I. Helper.

Mr. Hall moved that the President be elected by ballot seconded by Mr. Weisel. Motion carried and President Wheeler appointed Messrs. Stocking, Lakey and Russell C. Platt to act as tellers; the latter to be Chairman of the Committee.

Balloting was proceeded with while the tellers were busily sorting out the ballots and the minutes of the April meeting were read by the Secretary and approved.

Chairman Hall of the Membership Committee made a plea for membership in the A. PH. A. He referred to Dr. Beal's address at St. Louis, in which he presented many good reasons why pharmacists should join the Local Branch and thereby become affiliated with the parent association.

Chairman Platt reported the result of the election: *President*, Richard C. Byce; *First Vice-President*, Francis Koelzer; *Second Vice-President*, Wilbert Parker.

On motion of Mr. Hall and seconded by Mr. Webster, the Secretary was instructed to cast the ballot for the other officers recommended by the Committee on Nominations. The ballot was cast as instructed.

Mr. Wheeler expressed his appreciation to the officers who helped make his year of office successful and with a word of thanks to the University of Michigan College of Pharmacy he relinquished his chair to the new elected President. Mr. Byce thanked the assembly for the confidence placed in him and said with the aid of the seasoned members he hoped to be able to continue the pace set by his predecessors.

Prof. H. B. Lewis then introduced the speaker of the evening Dr. E. H. Volwiler, chief chemist of the Abbott Laboratories, who gave a most interesting talk on some of the new chemicals. He said many of the drugs in use to-day are comparatively new, and a field was open to the pharmaceutical chemist. He astounded the members with some startling figures. He said that more than half of those taking medicines employed "patent medicines" and that the number of these preparations had increased many fold during the last three or four decades. "The use of metallic chemicals," he said, "was in the following ratio—Arsenic 10, Bismuth 7, Mercury 4." He also referred to the number of lepers in all parts of the world.

A general discussion followed led by Messrs. Webster and Ingram. Mr. Seltzer moved a rising vote of thanks to the speaker; he was supported by Mr. Platt. Mr. Hall moved a vote of thanks to the officers of the Branch and Mr. Ingram suggested a vote of thanks to the Prescott Club and Dean Kraus for the hospitality shown the Detroit Branch in making this annual May meeting in Ann Arbor an event that is always looked forward to with much pleasure, which is indicated by the splendid attendance. After a rising vote of thanks President Byce adjourned the meeting.

BERNARD A. BIALK, *Secretary*.

PHILADELPHIA.

The May meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Tuesday evening, May 8th, at the new building of the Philadelphia College of Pharmacy and Science, 43rd St. and Kingsessing Avenue, President Nichols presided.

The minutes of the April meeting were read and approved. The Secretary read communications from E. C. Brokmeyer and Senator D. A. Reed relative to the resolution adopted by the Branch at the April meeting relating to a reduction of the narcotic tax on retail druggists from $6.00 to $3.00 a year. Mr. Brokmeyer advised communicating with Senator Reed. Senator Reed stated that, before the letter of the Secretary was received, the Finance Committee had decided against any reduction in the narcotic taxes.

The Secretary announced the appointment of the following Professional Relations Committee to serve for the ensuing year:

Wilmer Krusen, *Chairman;* F. E. Stewart, W. W. McNeary.

A letter was also read from Dr. Krusen accepting his appointment. President Nichols announced through the Secretary the application for membership in the AMERICAN PHARMACEUTICAL ASSOCIATION, of Abraham Kremenn and Harry J. Black. Accepted, pending the action of the parent body. These applications were obtained through our Chairman of the Membership Committee, Leo. G. Penn.

Hamilton D. Ware, the speaker of the evening, was next introduced and the rest of the

evening, under his able direction, was devoted to practice in Show-Card writing.

The meeting was featured by the number of college students present, and at its conclusion, refreshments were served.

MARIN S. DUNN, *Secretary.*

UNIVERSITY OF WASHINGTON.

The last regular meeting of the Branch was held May 10th at the American Legion Hall. As usual the last meeting took place in the form of a dinner. The Branch arranged the dinner in special honor of Dean Johnson, both as President of the A. PH. A. and in honor of his twenty-fifth year of continuous service as Dean of the College of Pharmacy, University of Washington. One hundred and seventy-five were seated at the tables. Purple Iris and golden Scotch Broom flowers, representing the colors of the University, were used as decorations. The program was as follows:

Music by O'Brien's sophomore class orchestra.

Reading by E. A. Florence.

Announcement of Honor Awards by Dean Johnson as follows:

U. of W. Branch A. Ph. A. Gold Medal, Norman F. Libert.

Lehn and Fink Gold Medal, Clivenden L. Cox.

Linton Memorial Honor Plaque, Clarence W. Brown.

Denny Fellowship, Miss Abigil Poole.

Skagit Valley Golden Seal Farm Fellowship, Paul S. Monroe.

National Drug Clerk's Membership, Edgar F. Kelly, F. B. Dean, Cecil R. Fields.

Dean Johnson announced that two new teaching fellows were added to the staff—L. W. Tobey and Paul S. Jorgenson; also, that Miss Ruby Hirose who has just received her master's degree in Pharmacy had been appointed to a Scholarship in the School of Public Health, Johns Hopkins University for next year.

Following these announcements the Secretary read several messages, expressing the best wishes and congratulations of the senders to Dean Johnson in honor his twenty-fifth anniversary as Dean, by the following:

E. R. Squibb & Co., by Clyde R. Eddy.

University of Illinois, School of Pharmacy, by Dean Wm. B. Day.

University of Purdue, School of Pharmacy and the A. A. C. P., by Dean Charles B. Jordan.

The AMERICAN PHARMACEUTICAL ASSOCIATION and the JOURNAL A. PH. A., by E. F. Kelly and E. G. Eberle.

Oregon State College, College of Pharmacy, by Dean A. Ziefle.

Mr. and Mrs. A. R. Burlage, of Corvallis Oregon.

A. F. Snyder of Anacortes, Washington.

At the completion of the reading W. Rising, in behalf of the students, presented Dean Johnson with a traveling bag. In spite of the fact that all of the students were aware of the coming presentation and messages, all came as a surprise to the Dean which added no little to the pleasure of the evening. Following this, Art. Nelson entertained ably with his Xylophone and the Roosevelt High trio of girls with several songs. After the music President Spencer of the University presented tribute to the Dean and included an interesting talk for the student body.

A piano solo by Charles Schwartz was the forerunner for the Melodrama presented by the graduates of the college, entitled, "The Elusive Pills." This dealt with an interesting chase for a box of strychnine pills given out by the doctor's wife for some baby's tablets. The doctor's frantic chase together with an invitation to talk to the students on "Carelessness Costs Life" added to the many interesting situations that arose. At the close of the play the actors were awarded with a handsome vegetable bouquet built in form of a tree.

President Richards adjourned the meeting at 9:30 P.M.

H. A. LANGENHAN, *Secretary.*

EDGAR FAHS SMITH MEMORIAL.

Friends of the late Dr. Edgar Fahs Smith are considering a memorial that will be fitting for the work in which Dr. Smith was prominent. He was engaged during many years of his life in collecting data, books, photographs, prints, etc., associated with great chemists. It is the intention to assemble this material because of its incalculable historical value and provide for it suitable filing cabinets and storage room.

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1927–1928.

Office of the Secretary, 10 West Chase St., Baltimore, Md.

LETTER NO. 13.

May 26, 1928.

To the Members of the Council:

89. Use of the Text of the N. F. V. Motion No. 32 (See Council Letter No. 12, page 498) has been carried and the *American Druggist* has been so notified.

90. Applicants for Membership. Motions No. 34 and No. 35 (See Council Letter No. 12, pages 498 and 499) have been carried and applicants for membership numbered 212 to 237, inclusive, and H-658 to H-661, inclusive, are, therefore, declared elected.

91. Prizes Membership Campaign. (The question has not been decided.)

92. Tentative Program for the Seventy-Sixth Annual Meeting. With the approval of Local Secretary Carswell and his associates, the Secretary submits the following tentative program which has the approval of the Special Committee on Program provided for by the Council (See Council Letter No. 14, 1926–1927, page 880, item 154 and Council Letter No. 3, 1927–1928, page 1117, item 29). Secretary Christensen of the N. A. B. P., Secretary Cooper of the A. A. C. P. and Secretary Lamont of the Conference of Pharmaceutical Association Secretaries have approved those parts of the program which relate to these organizations.

TENTATIVE PROGRAM FOR THE 1928 MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION AND AFFILIATED ORGANIZATIONS, EASTLAND HOTEL, PORTLAND, ME.

Alumni and Fraternity Luncheons can be arranged for Tuesday or Wednesday noon.

MONDAY, AUGUST 20TH.

9:00 A.M. Meeting of the Council, A. PH. A.
9:00 A.M. National Association Boards of Pharmacy.
9:00 A.M. American Association of Colleges of Pharmacy, Teachers' Conferences, Chemistry Section; Practical Pharmacy Section; Materia Medica, Pharmacognosy and Botany Section; Commercial Pharmacy Section.
2:00 P.M. National Association Boards of Pharmacy.
2:00 P.M. American Association of Colleges of Pharmacy.
2:00 P.M. Visit to the Longfellow Home (for the ladies).
6:00 P.M. American Association of Colleges of Pharmacy, Dinner.
8:00 P.M. National Association Boards of Pharmacy.
8:00 P.M. American Association of Colleges of Pharmacy.
9:30 P.M. Informal Dance.

TUESDAY, AUGUST 21ST.

8:30 A.M. Joint Session National Association Boards of Pharmacy and American Association of Colleges of Pharmacy.
1:30 P.M. First Session House of Delegates, A. PH. A.
2:00 P.M. Auto Trip to Fort Williams (for the ladies).
2:30 P.M. National Association Boards of Pharmacy.
2:30 P.M. American Association of Colleges of Pharmacy.
6:30 P.M. AMERICAN PHARMACEUTICAL ASSOCIATION, Banquet, followed by dancing.

WEDNESDAY, AUGUST 22ND.

9:00 A.M. First General Session, A. PH. A.
2:00 P.M. House of Delegates, A. PH. A.
2:00 P.M. Card Party (for the ladies).
4:30 P.M. Conference of Pharmaceutical Association Secretaries.
8:00 P.M. First Session Scientific Section.
First Session Section on Commercial Interests.
First Session Section on Historical Pharmacy.
9:30 P.M. Informal Dance.

THURSDAY, AUGUST 23RD.

9:00 A.M. Council, A. PH. A.
9:00 A.M. First Session Section on Education and Legislation.

First Session Section on Practical Pharmacy and Dispensing.
Second Session Section on Historical Pharmacy.

12:00 M. Luncheon of Veteran Druggists.
2:00 P.M. General Session, A. PH. A.
2:30 P.M. Auto Ride (for the ladies).
4:30 P.M. Conference of Pharmaceutical Association Secretaries.
8:00 P.M. Joint Session Scientific Section and the Section on Practical Pharmacy and Dispensing.
Second Session Section on Commercial Interests.
8:00 P.M. Card Party (for the ladies).

FRIDAY, AUGUST 24TH.

9:00 A.M. House of Delegates, A. PH. A.
1:15 P.M. Organ Recital (Municipal Organ) in City Hall.
2:30 P.M. Second Session Scientific Section.
Second Session Section on Education and Legislation.
Second Session Section on Practical Pharmacy and Dispensing.
7:00 P.M. Final Session House of Delegates.
9:00 P.M. Final General Session, A. PH. A.
10:30 P.M. Reorganization Meeting of the Council, A. PH. A.

SATURDAY, AUGUST 25TH.

10:30 A.M. Sail among the Islands in Casco Bay followed by a Grand Shore Dinner.

The principal changes made in arranging this standard program are as follows: the annual dinner of the A. A. C. P., is provided for on Monday evening in place of Tuesday; four three-hour periods are set aside for the sessions of the Sections which makes it necessary for not more than three sections to meet at the same time and gives each section two full sessions with an extra joint session for the Scientific Section and the Section on Practical Pharmacy and Dispensing; provision is made for two sessions of the Conference of Pharmaceutical Association Secretaries.

The President's Address will be delivered at the first General Session on Wednesday morning, August 22nd, and no business will be transacted at the banquet on Tuesday evening.

Motion No. 36. It is moved by Kelly that the tentative program for the seventy-sixth annual meeting be approved by the Council.

E. F. KELLY, *Secretary.*

REMINGTON HONOR MEDAL PRESENTATION.

The Remington Honor Medal has been awarded for the eighth time, the recipient being Charles H. LaWall,[1] dean of the Philadelphia College of Pharmacy and Science. The ceremonies of the occasion were held in Hotel Pennsylvania, May 14th.

Remington Honor Medal Presented to Charles H. LaWall May 14, 1928.

Charles H. LaWall.

The originator of the Remington Medal idea is the present President of the New York Branch A. PH. A., Dr. Hugo H. Schaefer, who presided at the dinner given in honor of the medalist. Dr. Jacob Diner, as the Senior Past-President of the Branch presented the medal and in doing so paid a high tribute to the recipient's services to pharmacy.

[1] A brief sketch will be found in JOUR. A. PH. A., January 1918, 7.

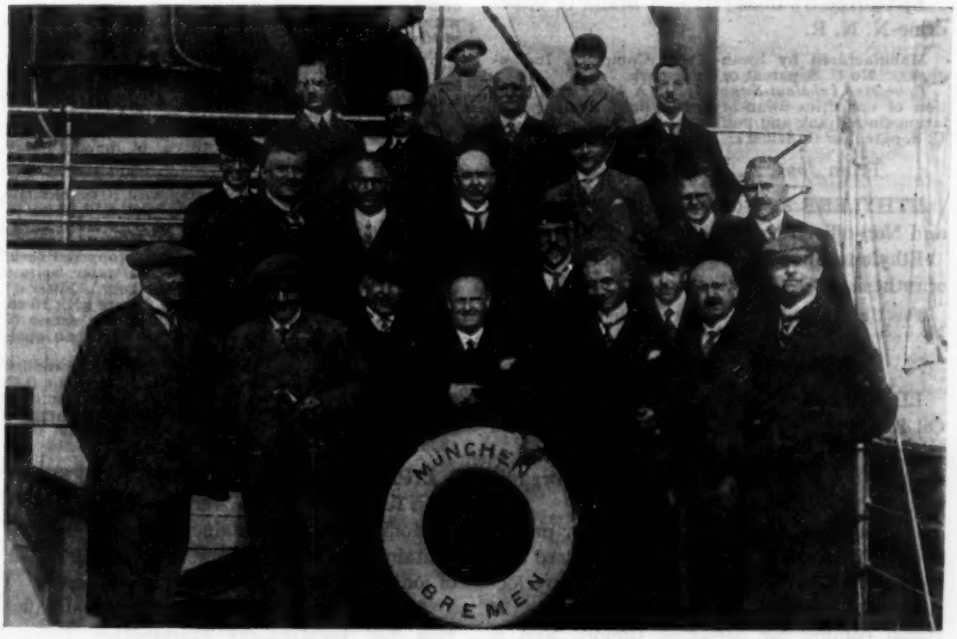
Speakers of the evening were, Secretary E. F. Kelly, of the AMERICAN PHARMACEUTICAL ASSOCIATION, who spoke of "LaWall the Pharmaceutical Organization Worker;" Prof. H. V. Arny's subject was "LaWall the Author;" "LaWall the Educator" that of Prof. Ivor Griffith and Dr. E. Fullerton Cook spoke of his colleague as "The Public Servant."

In accepting the medal Dr. LaWall gave an account of his earlier years, his opportunities, inclinations and the influences which contributed to his development. He spoke with feeling of his predecessor in his *Alma Mater*, in whose memory the medal was established, and also of others to whose influences and guidance he owed much, closing with a tribute to Mrs. LaWall.

There were more than a hundred guests in attendance including also the German apothecaries who toured part of the United States during the past month. Dr. Wartenberg, one of the party, added a few words of commendation and appreciation.

Professor LaWall's affiliation with the AMERICAN PHARMACEUTICAL ASSOCIATION dates from 1896. Herein he has been not only a faithful and enthusiastic worker but a wise counsellor in the service on committees, as Section officer and President, ever holding up a higher standard. His contributions have always the aim for improvement and advancement and touch on practically every phase of pharmacy and the drug business. His record as member and officer of the Revision Committees of the U. S. Pharmacopœia and National Formulary exhibit his earnestness, energy and capacity for work. In his address as President of the American Conference of Pharmaceutial Faculties he emphasized the need of impressing pharmacy students with their obligations. He contends that a professor should know more than his own subject if he is to function efficiently as a unit in the scheme of educational progress.

His recent literary and historical production, "Four Thousand Years of Pharmacy," has a distinctive value, for it has made the reading public better acquainted with pharmacy. Summarizing and using the substance of the remarks of the speakers of the evening—LaWall's work has a wide application, his activities are many-sided; he possesses the scientific interest and professional spirit; he studies problems for their general worth and value and interprets wisely their meaning, importance and service to pharmacy and to the public.



GERMAN APOTHECARIES, WHO VISITED A NUMBER OF CITIES IN THE UNITED STATES BEFORE LANDING IN NEW YORK. THEY WERE GUESTS AT THE DINNER OF NEW YORK BRANCH A. PH. A.

EDITORIAL NOTES

Editor: E. G. EBERLE, 10 West Chase St., Baltimore, Md.

Members of the Council, A. PH. A.: S. L. HILTON, *Chairman;* CHARLES H. LAWALL, *Vice-Chairman;* E. F. KELLY, *Secretary;* H. V. ARNY, A. G. DUMEZ, GEO. M. BERINGER, H. C. CHRISTENSEN, J. A. KOCH, J. H. BEAL, W. B. DAY, T. J. BRADLEY. *Ex-Officio Members:* C. W. JOHNSON, *President;* AMBROSE HUNSBERGER, JOSEPH JACOBS, *Vice-Presidents;* C. W. HOLTON, *Treasurer;* E. G. EBERLE, *Editor of the Journal;* A. G. DUMEZ, *Editor of the Year Book;* LEONARD SELTZER, *Chairman of the House of Delegates.*

Collaborators: The Members of the Council; E. FULLERTON COOK, *Chairman,* U. S. P. Revision Committee; W. L. SCOVILLE, *Chairman,* N. F. Revision Committee; the Chairmen of the Sections, A. PH. A.; L. W. ROWE, M. N. FORD, ADLEY B. NICHOLS, C. LEONARD O'CONNELL, W. P. PORTERFIELD; EDWARD SPEASE, *President,* A. A. C. P.; CHARLES B. JORDAN, *Chairman,* Executive Committee, A. A. C. P.; A. C. TAYLOR, *President,* N. A. B. P.; HENRY C. CHRISTENSEN, *Secretary,* N. A. B. P.

NEW AND NONOFFICIAL REMEDIES.

The following additional articles have been accepted as conforming to the rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the rules on which the Council bases its action will be sent on application.

W. A. PUCKNER, *Secretary.*

EPHEDRINE (See New and Nonofficial Remedies, 1928, p. 174.)

Ephedrine-Swan-Myers.—A brand of ephedrine-N. N. R.

Manufactured by Swan-Myers Company, Indianapolis. No U. S. patent or trademark.

Ephedrine Inhalant-Swan-Myers: A 1 per cent solution of ephedrine-Swan-Myers in light liquid petrolatum tinted pink and perfumed with oil of rose. No U. S. patent or trademark.

From *Jour. A. M. A.*, April 28, 1928.

ETHYLENE FOR ANESTHESIA (See New and Non-official Remedies, 1928, p. 51.)

Ethylene-Cheney.—A brand of ethylene for anesthesia-N. N. R.

The Cheney Chemical Co., Cleveland, distributor. No U. S. patent or trademark.

From *Jour. A. M. A.*, May 5, 1928.

LIPIODOL-LAFAY.—Iodized Poppy-seed Oil 40 per cent.—An iodine addition product of poppy-seed oil containing 39 to 41 per cent of iodine (0.54 Gm. of iodine per cc.) in organic combination.

Actions and Uses.—Lipiodol-Lafay, on account of its high molecular weight, is used as a contrast medium in myelography and pyelography, for detecting urethral structures, in the spinal column for detecting tumors, and in other conditions for which roentgenologic is desired.

Dosage.—From 1 cc. to 5 cc. (15 to 75 minims) or more according to the uses to which it is to be put.

Manufactured by Andre Guerbet & Cie., Paris (E. Fougera & Co., New York, distributor). No U. S. patent. U. S. trademark 196,499.

Ampoules Lipiodol-Lafay, 1 cc.
Ampoules Lipiodol-Lafay, 2 cc.
Ampoules Lipiodol-Lafay, 3 cc.
Ampoules Lipiodol-Lafay, 5 cc.

Lipiodol-Lafay is a thick, viscous oily liquid, having an alliaceous odor and an oleaginous taste, insoluble in water. On exposure to air and sunlight it decomposes, turning a dark brown color. Specific gravity at 20 C., from 1.340 to 1.350.

Boil 0.5 cc. of lipiodol-Lafay and 10 cc. of alcoholic solution of potassium hydroxide (1 in 10), in a porcelain dish for about five minutes, evaporate the liquid on a water-bath and ignite the residue. Dissolve the residue in 10 cc. of water, filter the solution, add 5 cc. of hydrochloric acid to the filtrate, then add chloroform and a few drops of chlorine water and agitate: the chloroform solution is violet. Dissolve 1 cc. of lipiodol-Lafay in 10 cc. of chloroform, add a few drops of phenolphthalein solution and 0.3 cc. (1 drop) of tenth-normal sodium hydroxide solution: the liquid becomes red (*limit of acidity*). Mix 10 cc. of lipiodol-Lafay with 50 cc. of petroleum benzin: a transparent liquid results.

Boil obout 1 cc. of lipiodol-Lafay with 10 cc. of nitric acid and 0.5 Gm. of silver nitrate, cool, add 25 cc. of water, collect the precipitate formed on a filter paper, wash free from the excess of silver nitrate; puncture the filter, collect its contents in a glass-stoppered flask, treat with 50 cc. of stronger ammonia water, agitate thoroughly and allow to stand for one hour. Filter off the insoluble silver iodide; treat the filtrate with 15 cc. potassium iodide solution, and remove the excess of ammonia by evaporation on a steam-bath: no opalescence results (*absence of chlorine compounds*).

Ignite about 1 Gm. accurately weighed: the residue does not exceed 0.01 per cent. Transfer about 0.35 Gm. accurately weighed, to a bomb tube; determine the iodine content by the Carius method: the amount of iodine found is not less than 39 per cent nor more than 41 per cent.

LIPIODOL RADIOLOGIQUE DESCENDANT.—Iodized Poppy-seed Oil 35 per cent.—An iodine addition product of poppy-seed oil containing 34 to 36 per cent of iodine (0.45 Gm. of iodine per cc.) in organic combination.

Actions and Uses.—In subarachnoid injection for roentgen-ray examination, lipiodol radiologique descendant is used for the recognition of intradural tumors.

Dosage.—In the normal subject, 2 cc.

Manufactured by Andre Guerbet & Cie., Paris (E. Fougera & Co., New York, distributor). No U. S. patent. U. S. trademark 196,499.

Lipiodol radiologique descendant is a yellow, oily liquid, having an alliaceous odor and an oleaginous taste, insoluble in water. On exposure to air and sunlight it decomposes, turning a dark brown color. Specific gravity at 20 C., from 1.270 to 1.280.

Lipiodol radiologique descendant conforms to the tests for identity and purity, ash and assay as described under lipiodol-Lafay, except that the iodine content found is not less than 34 per cent nor more than 36 per cent.

LIPIODOL RADIOLOGIQUE ASCENDANT.—Iodized Poppy-seed Oil 10 per cent.—An iodine addition product of poppy-seed oil containing 9.8 to 11.2 per cent of iodine (0.11 Gm. of iodine per cc.) in organic combination.

Actions and Uses.—In subarachnoid injection for roentgen-ray examination, lipiodol radiologique ascendant is used for recognition of intradural tumors when it is desired to employ a contrast medium of lesser density than that of the spinal fluid.

Dosage.—From 1 to 2 cc., previously brought, with the syringe, to a temperature of 40 C.

Manufactured by Andre Guerbet & Cie., Paris (E. Fougera & Co., New York, distributor). No U. S. patent. U. S. trademark 196,499.

Lipiodol radiologique ascendant is a yellow, oily liquid, having an alliaceous odor and an oleaginous taste, insoluble in water. On exposure to air and sunlight it decomposes, turning a brown color. Specific gravity at 20 C., from 0.99 to 1.00.

Lipiodol radiologique ascendant conforms to the test for identity and purity, ash and assay as described under lipiodol-Lafay, except that the iodine content found is not less than 9.8 per cent nor more than 11.2 per cent.

MEAD'S POWDERED BOILABLE PROTEIN MILK.—A modified milk preparation having a relatively high protein content and a relatively low carbohydrate content. Each 100 Gm. contains approximately protein, 39 Gm.; butter fat, 27 Gm.; lactose, 24 Gm.; free lactic acid, 2 Gm.; ash, 6 Gm.; and moisture, 2 Gm.

Actions and Uses.—When suitably mixed with water, powdered boilable protein milk is useful for correcting intestinal disorders of infants and children. The nutritive value of 500 Gm. of the dry powder corresponds approximately to 2535 calories.

Dosage.—For the majority of conditions powdered boilable protein milk should be given in small quantities according to the age and condition of the patient and, in cases of diarrhea, after a period of starvation of from twelve to twenty-four hours. Suitable carbohydrate may be gradually added to the feeding, as indicated by the clinical conditions.

To prepare the normal dilution of powdered boilable protein milk use, 1 ounce (4 level tablespoonfuls) is placed on the surface of 11 fluidounces of cold, previously boiled, water and then beaten with an egg beater. The mixture may be heated to boiling and, while stirring, boiled for five to ten minutes. Carbohydrates, if prescribed, can be added at the time the powdered boilable protein milk is added to the water. One hundred cc. of the normal dilution, without additional carbohydrate, contains approximately 3.16 Gm. of protein, 2 Gm. of lactose, 2.25 Gm. of butter fat, and 0.17 Gm. of free lactic acid; p_H 5.2. The nutritive value of 500 Gm. corresponds approximately to 230 calories.

Manufactured by Mead, Johnson and Company, Evansville, Ind. No U. S. patent or trademark.

ANTIRABIC VACCINE (See New and Non-official Remedies, 1928, p. 363.)

Pasteur Institute St. Louis.

Antirabic Virus (Semple).—An antirabic vaccine prepared according to the general method of David Semple (phenol killed). It consists of a sterile suspension of the brain tissue of rabbits moribund from the injection of a virulent fixed strain of rabies. The virus is killed by the use of phenol and by incubation at 37.5 C. for twenty-four hours. Marketed in packages of fourteen doses, each dose consisting of 2 cc., contained in an ampule. All the doses are of the same potency; one dose is to be given daily over a period of fourteen days.

From *Jour. A. M. A.*, May 19, 1928.

COMMERCIAL STANDARD FOR CLINICAL THERMOMETERS ADOPTED.

The general conference of manufacturers, distributors and organized users of clinical thermometers held March 30, 1928, at the Department of Commerce, Washington, D. C. approved a proposed Commercial Standard which established the minimum requirements in the manufacture of thermometers of this character.

The conference agreed that the manufacture of new thermometers under the standard will begin October 1, 1928 and allowed one year, *i. e.*, until March 30, 1929, for clearance of existing manufacturers' stocks. Annual revision of the standard will be conducted by a standing committee, representative of the industry.

The conference favored the promotion of foreign commerce in clinical thermometers based on the adopted standard. The standard will be translated into Spanish and Portuguese. Acceptance by manufacturers, distributors and organized users, representing 65 per cent of the total volume of the industry, is necessary before the program can be promulgated as a Commercial Standard of the Department of Commerce.

The industry is determined to market only accurate and reliable clinical thermometers. Each thermometer will be certified by the manufacturer to comply in all respects to the requirements and tests of the standard adopted.

Members of the Standing Committee are as follows: Bradford Noyes, Jr., of the Taylor Instruments Companies, Rochester, N. Y.; William L. Crounse, of the National Wholesale Druggists Association, Washington, D. C.; Friend Lee Mickle, of the State Department of Health, Hartford, Conn.; Dr. W. P. Morrill, of the American Hospital Association, Washington, D. C.; Dr. A. C. L. Percefull, of the U. S. Veterans Bureau, Washingron, D. C.; Herman Phillips, of the Phillips Thermometer Co., New York City; Otto W. Schlegelmilch, of Schlegelmilch Bros., Long Island City, New York; and Dr. E. F. Mueller, of the Bureau of Standards, Washington, D. C.

The Commercial Standard as adopted provides that every individual maximum self-registering thermometer sold or offered for sale to measure body temperatures shall have met all of the requirements specified herein. All thermometers shall meet the following requirements as to construction:

Fahrenheit thermometers shall be graduated in 0.2° F., each degree mark and the mark at the normal point shall be longer than the intervening lines. Centrigrade thermometers shall be graduated in 0.1° C., each degree and half degree mark shall be longer than the intervening lines. Numerals shall be etched on the scale at even-numbered degree marks on Fahrenheit thermometers, and at every degree mark except as hereinafter provided, on Centigrade thermometers. There shall be not more than 10° F. or 5.5° C. per inch of scale. All thermometers shall be free from any defects which impair the reliability or seriously mar the appearance. The range of scale shall be at least from 96° F. or 35° C., to 106° F. or 41° C. The 96° F. mark or the 35.5° C. mark shall be not less than one-half inch from the top of the contraction, that is, from the point at which the capillary resumes its normal shape above the contraction. Bulbs shall be made of Corning normal, or equally satisfactory thermometric glass. Colored bulbs shall not be used. Each thermometer shall bear in legibly engraved characters, the name or trade mark of the manufacturer and either a serial number, or a serial number and year, to provide complete identification. The normal point, except for veterinary use, shall be designated by an arrow or other suitable mark at 98.6° on Fahrenheit thermometers and in lieu of the numeral 37 on Centigrade thermometers.

Character of Pigment.—Sample thermometers shall be immersed in a 5 per cent phenol in water solution for a period of one hour at a temperature above 70° F. without the indication of removal of the coloring matter or its appearance in the solution. All thermometers shall retain their pigments after the completion of all tests herein required.

Test for Entrapped Gas.—In some cases gas is detected in the preliminary examination but its presence is not always detected in thermometers which have gas pocketed in the bulb or constriction. All thermometers shall be heated to about 96° F. and the mercury above the constriction shaken off. The bulbs only are then cooled to 32° F. or below, and may be manipulated by any method (except tapping or striking any part of the thermometers upon any surface whatsoever, unless the manufacturer desires to do so) to bring the gas to the top of the bulbs. When the bulbs are heated after this operation the mercury from the bulbs shall reunite with that in the bores.

Hard Shaker Test.—All thermometers, after having been heated to 106° F. or 41° C. shall be mounted in a centrifuge with the ends of the bulbs 17 cm., from the axis of rotation. When whirled at a speed of 580 revolutions per minute the index shall fall below 96° F. or 35.5° C.

Accuracy.—Except for such states as do not accept these specifications, thermometers shall be compared at 98°, 102° and 106° F., or 37°, 39° and 41° C., with certified clinical standards by heating in a well-stirred water-bath, removing from bath and reading. The temperature of the bath shall be rising at a rate of not more than $^1/_{10}$ degree F. per minute for the last minute before the thermometers are removed. Two independent comparisons shall be made at each test point. The mean of the readings at 98° and 102° F. (37° and 39° C.) shall not differ from the corrected indication of the standard by more than 0.2° F. (0.1° C.). The mean of the readings at 106° F. (41° C.) shall not differ from the corrected indication of the standard by more than 0.3° F. (0.15° C.). If the results of any two tests at the same point differ from each other more than 0.15° F. (0.08° C.) a thermometer shall not be rejected for this cause alone, but will be subjected to additional tests for repetition and for retreat. If the maximum variation is more than 0.2° F. or 0.1° C., the thermometer shall be rejected

for failure to repeat readings. Errors in the value of an interval between two adjacent test points shall not exceed 0.3° F. or 0.15° C. Rejection of thermometers for inaccuracy under this heading shall be made on the basis of the nearest 0.1° F. or 0.05° C.

Aging.—All thermometers shall be aged for a period of at least four months, aging to begin after completion of the constriction.

Certificate.—Each thermometer shall be accompanied by a certificate which shall include the following statement: "We, the undersigned manufacturers, hereby certify that our registering clinical thermometer marked No. ——, will meet all of the requirements and tests as specified in the United States Department of Commerce, Commercial Standard No. —— for Clinical Thermometers."

BULLETINS OF THE DRUG TRADE BUREAU OF PUBLIC INFORMATION.

Director Robert P. Fischelis, of the Drug Trade Bureau of Public Information, has recently issued a number of bulletins, one of them pertaining to the Headquarters site in Washington and the other to the coöperation of the Bureau of Public Health and the pharmaceutical publications. Both of these bulletins have general interest and make the public better acquainted with the mission of pharmacy.

THE WESTERN DRUGGIST TAKES OVER THE BULLETIN OF PHARMACY.

The *Western Druggist*, of Chicago, has acquired the ownership of the *Bulletin of Pharmacy* of Detroit, Mich. The office of the publication has been removed to Chicago and the publication is to be known as the *Drug Bulletin*.

JOINT CONFERENCES OF HEALTH OFFICERS.

Joint conferences of federal, state and local organizations were held in Minneapolis, June 8th and 9th. These were presided over by Surgeon-General Dr. Hugh S. Cumming.

UNIVERSITY OF WISCONSIN PREPARED TO EXTEND RESEARCH TO BUSINESS.

In an address at a recent conference of Wisconsin business leaders held under the auspices of the School of Commerce of the University of Wisconsin, Dr. Glenn Frank, President of the Institute, announced that the University was prepared to extend to business men the benefits of research just as it had done in the case of the farmer in the past.

LIBRARY COÖPERATION WITH MEXICO.

Plans for bringing about greater coöperation between the libraries of Mexico and those of the United States and Canada were discussed at the meeting of the American Library Association held at West Baden, Ind., May 28th to June 2nd. A number of representatives from Mexico were in attendance.

GERMANS STUDYING AMERICAN ADVERTISING METHODS.

German advertising specialists will tour the United States with the purpose of gaining information relative to methods of this country. Among the cities to be visited by the delegation are New York, Philadelphia, Buffalo, Pittsburgh and Detroit.

REVISION OF THE BRITISH PHARMACOPŒIA.

Considerable publicity has been given in the press of Great Britain to the report of the subcommittee on the British Pharmacopœia of the Committee of Civil Research. A good many changes in the method of revision are contemplated. The report is signed by Mr. H. P. Macmillan, K.C., *Chairman;* Lord Dawson of Penn, Sir Donald MacAllister, Dr. H. H. Dale, Mr. Edmond White and Dr. H. Guy Dain.

PERSONAL AND NEWS ITEMS.

Dr. William Draper Harkins, professor of physical chemistry at the University of Chicago, received the Willard Gibbs Medal for 1928 from the Chicago section of the American Chemical Society at a meeting held at the Palmer House, May 25th.

Moritz A. Dittmar, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, is at present in Buenos Aires.

Following a custom of several years past, **Romaine Pierson,** publisher of the *Practical Druggist,* honored Editor **Reginald E. Dyer** with a birthday Luncheon at the Drug Chemical Club, last month. Mr. Dyer's countenance does not show the coming and going of years, but always beams a welcome.

Hans Martin Johnson, the well and favorably known St. Paul druggist, has been appointed chairman of the committee on arrangements for the 1929 convention of the Minnesota Pharmaceutical Association, which will be held

in St. Paul next February. Mr. Johnson has for many years been prominently identified with drug activities and is a member of the A. PH. A.

J. A. Reidel of Boulder, Montana, Secretary of the Montana Board of Pharmacy, also of the Rocky Mountain Druggists' council, has sold his store to his clerk, Arthur Aspengrin.

Governor Hammill has reappointed **George Judisch** of Ames, Iowa, as a member of the State Board of Pharmacy for the three-year term beginning July 1st. Mr. Judisch was Vice-President of the A. PH. A., in 1926.

E. von Hermann, Chicago, member of the A. PH. A. and prominent C. V. D. A. member, is visiting in Germany.

Mortimer Bye, has been elected second Vice-President of The William S. Merrell Company; he is the scientific director of the Company.

Harry Noonan, member of the A. PH. A. and President of the Drug Products Co., Inc., was elected President of the Queens Borough Rotary Club, of Long Island City.

W. G. Ungerer, President of Ungerer & Co., is in Europe for a brief visit.

Leonard A. Seltzer, Chairman of the HOUSE OF DELEGATES, A. PH. A., recently addressed the students of the Philadelphia College of Pharmacy and Science, on the subject of "Prescription Pricing."

F. C. Sennewald and wife, St. Louis, are sight-seeing in Europe.

William A. Oren and **Walter H. Cousins** were among the speakers at the meeting of Oklahoma Pharmaceutical Association. The latter has sustained an enviable reputation as a flier, having gained his wings on a stretch between Hot Springs and Little Rock.

William Kirkby, honorary member of the A. PH. A., has been elected President of the Manchester Pharmaceutical Association for the ensuing year. Mr. Kirkby was an important witness before the Royal Commission on Arsenical Poisoning in 1901, and a few years later received the well-merited degree of Master of Science from the University of Manchester on which he had been Lecturer in Pharmaceutics. His connection with the British Pharmaceutical Conference dates from 1886, and in 1919 he was its President.

Charles F. Lanwermeyer, formerly chief chemist for John T. Milliken Co., is now control chemist for Abbott Laboratories.

Joseph Jacobs, Vice-President of the A. PH. A., advises that he is not associated with the Chain effected by the recent merger of about 40 stores in Atlanta. He expects to continue the pharmacies of which he is the head.

Dr. F. Schoofs, professor of pharmaceutical chemistry of Liege, Belgium, a member of the Superior Council of Public Health of Belgium, is on a visit in this country and is making an inspection of pharmacy institutions. He remained several days with Dean Frederick J. Wulling and also was entertained by Chairman of the Council A. PH. A., S. L. Hilton.

In the *Washington Post,* of May 13th, Mrs. Annie Kilburn Kilmer (wife of our fellow-member, Dr. F. B. Kilmer) contributed "The Great Adventure." As is known to most members that Mrs. Kilmer is the mother of Joyce Kilmer, the poet who was killed in action on the battlefields of France. The reminiscence was peculiarly appropriate for the meeting of the American War Mothers' Association which met recently at the tomb of the unknown. The story is a part of the second volume of "Whimsies," now awaiting publication and is written as one Gold Star Mother to another.

In recognition of twenty-five years of faithful and constructive service, the Board of Directors of the Smith, Kline and French Company, Philadelphia, has voted an extended leave of absence with a European tour to **Joseph W. England.**

Mr. England, accompanied by Mrs. England and daughter, plan to sail on the Lancastria on June 29th. They have planned quite an extensive itinerary, which includes the Western Mediterranean and Italy—then North through Norway and Sweden, the British Isles, then France and home.

Paul S. Pittenger, Secretary of the Scientific Section A. PH. A., and Jerry McQuade, of *Drug Topics,* are named among the speakers at North Carolina Pharmaceutical Association meeting.

Alfred W. Pauley, Vice-President of the A. PH. A., will be one of the speakers at the meeting of Wisconsin Pharmaceutical Association.

Dean Theodore J. Bradley, of Massachusetts College of Pharmacy, officiated at the cornerstone laying of the new laboratories of the Tailby-Nason Company, in Boston.

A number of South Dakota druggists have gained legislative honors; among them, **William Buttz** has been nominated to succeed himself as senator from Brown County; **L. E. Highley,** of Hot Springs, was nominated for the state senate and was also elected mayor;

George Williams, of Reliance, is in the race for representative; **V. E. Frantz,** of Lake Norden, is a candidate for the house to succeed himself; **H. H. Humphrey** and **A. C. Thompson,** of Colton, have been nominated for representatives from their respective counties.

A. Kiefer Mayer, of the Research Bureau, will speak on "simplification of stock" at the Illinois Pharmaceutical Association meeting, "Looking Ahead" is the subject of **Carl Weeks; Samuel C. Henry** will speak on "Facts and Fallacies" and **Samuel L. Antonow's** subject is "Retail Conditions in the United States;" the latter will also speak before Texas Pharmaceutical Association.

The 1928 invitation of Tennessee School of Pharmacy is dedicated to its dean, **Dr. A. Richard Bliss.** It is artistically gotten up and the dedication speaks for the regard of the student body.

R. B. White, Houston, Tex., druggist, made an automobile record of 819 miles in 17 hours and 32 minutes, with one man at the wheel for the entire distance, from Houston to El Paso.

J. Leon Lascoff has given a Life Membership prize in the AMERICAN PHARMACEUTICAL ASSOCIATION to Ralph Sorkenn; his two annual membership prizes at the New York College of Pharmacy were awarded to Irving Chase and Jacob R. Silverman.

Copies of the address by **Dr. F. J. Wulling** on "How Physicians Can Help the Increasing Trend of Professional Pharmacy Away from Commercialism," published in the April number of the JOUR. A. PH. A., were distributed during the meeting of the American Medical Association. This work was made possible through the coöperation of the Minneapolis Veteran Druggists' Association and the Minnesota State Pharmaceutical Association.

Dr. Russell L. Cecil, delivered the Commencement address at the Medical College of Virginia at which time a Doctor of Science degree was conferred on him. Dr. Cecil is an alumnus of the College.

Edward Bloomfield, for twenty-two years attorney for the Kentucky Board of Pharmacy, has resigned from that office and will devote his time to the general practice of law, specializing in matters relating to pharmacy and the drug industries.

Frank E. Mortenson of the Legislative Committee of the California Pharmaceutical Association has been very active in stimulating the interest of druggists in behalf of the Capper-Kelly bill.

Prof. John Uri Lloyd entertained the German pharmacists who made a tour of this country.

Birmingham, Ala. druggists are using every opportunity to impress on organizations and the public the importance of the pharmacist in promoting public health.

President Hal Duncan of the Alabama Pharmaceutical Association was principal speaker at a banquet of the students of the School of Pharmacy of Alabama Polytechnic Institute; **Secretary W. E. Bingham** and **S. A. Williams** were also speakers of the occasion.

Charles H. V. Lewis, of Los Angeles, is endeavoring to lower the rental charges of drug stores. It would seem that this is a worthwhile undertaking and it is hoped that he will meet with a degree of success, because in quite a number of instances the rents are out of proportion with the sales volume of many stores.

At the Louisiana Pharmaceutical Association meeting **E. H. Daste,** of New Orleans, was awarded the I. L. Lyons & Co. honor cup for having rendered the most distinguised service to pharmacy and the drug trade in Louisiana during the past year.

Secretary E. F. Kelly of the A. PH. A. is visiting a number of State Pharmaceutical Associations in the Western states and of the Pacific Coast; among them, Colorado, Nebraska, Utah, California, Oregon, Washington and Wyoming.

PORTLAND, ME., CHAMBER OF COMMERCE SENDS OUT INVITATIONS TO MEMBERS OF THE A. PH. A.

The Portland, Me. Chamber of Commerce has recently issued a letter in which it extends a general invitation to pharmacists to visit Portland during the week of August 20th at which time the AMERICAN PHARMACEUTICAL ASSOCIATION will convene and also the affiliated bodies—A. A. C. P., N. A. B. P., Conference on Pharmaceutical Research and of Pharmaceutical Secretaries. The Chamber of Commerce invites correspondence from those who contemplate making a visit to Maine and offers to give information relative to travel by auto, rail and water.

THE CONFERENCE ON PHARMACEUTICAL RESEARCH MEETS IN PORTLAND, ME., AUGUST 18TH.

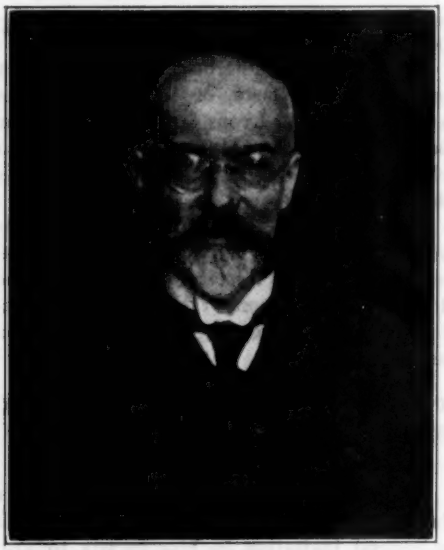
Chairman H. V. Arny has announced that the Conference on Pharmaceutical Research will meet in Eastland Hotel, Portland, Me., August 18th.

OBITUARY.

JOHN GEORGE GADAMER.

Prof. Dr. John G. Gadamer, honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION, one of the foremost pharmacists engaged in research work, died at his home April 15th, aged 60 years.

Dr. Gadamer succeeded the late Prof. Ernst Schmidt as editor of the *Pharmaceutical Archives* and also became his successor at the University of Marburg, where he carried on most of the work that contributed to his great name in research. After the death of his predecessor he revised and reëdited the several books of which Professor Schmidt was author.



J. G. GADAMER.

In the October 1923 number of the JOURNAL will be found quite an extended sketch by Dr. Hugo Schaefer, giving an account of Dr. Gadamer's activities, from which we glean:

"The deceased was born April 1, 1867, in Waldenburg, Germany, where the earlier part of his life was spent. After graduating from the 'gymnasium' he accepted an apprenticeship under Apotheker Dankwortt in Magdeburg; following service, elsewhere, in other pharmacies—in 1891—attracted by the work and reputation of Prof. Dr. E. Schmidt, he matriculated at the University of Marburg. Up to this time, Gadamer had shown great interest in botany, but under the tutelage of Prof. Schmidt he soon chose chemistry as his life-work. In 1893, he passed the State Board examinations and in the same year became Private Assistant to Prof. Schmidt. The following year he was elected University Assistant in the Chemical-Pharmaceutical Institute at Marburg. In 1895 he presented a thesis on "Thiosinamin and Its Halogen Addition Products" and obtained the Ph.D. degree. He now decided to devote his life to academic work and in 1897, because of his work on the constituents of black and white mustard, he was appointed Assistant Professor of Pharmaceutical Chemistry and of Food Chemistry. At this time he determined the constitution of sinigrin, sinalhin and sinapin. After considerable more work on similar glucosides, he took up the study of the alkaloids and explained the conversion of hyoscyamine into atropine and of *d*-scopolamine into *i*-scopolamine. In 1902 he was appointed Professor at the University of Breslau, where he not only organized the Pharmaceutical Insitute but also found sufficient time to continue his research work. Dr. Gadamer developed a theory on the formation of alkaloids in the plant and of their biological value to the plant."

M. LEON GUIGNARD.

Prof. Leon Guignard, elected Honorary Member of the A. PH. A. in 1920, died, March 7th, at his home in Paris, France, aged 75 years.

In 1876 he gained an interneship as pharmacist in the hospital of Paris, later taking charge of the laboratory. In 1883, he was elected Professor of Botany at the University of Lyons and four years later to a like chair in the Pharmacy School of Paris. Many honors came to him on account of his achievements and among the distinctions and degrees are silver and gold medals of the interneship, the superior diploma of pharmacy, the doctorate of natural science, the Bordin Prize of the Institute and the Buignet prize of the Academy of Medicine, and he was honored with the presidency of the Botanical Society of France, the vice-presidency of the society of biology, the honorary presidency of the Society of History of Pharmacy, and of the Association of Students in Pharmacy of France. He was a former President of the Academy of Science, a member of the Academy of Medicine, and the National Academy of Agriculture in France, officer of the Legion of Honor, member of the Superior Board of Public Instruction, of the

Board of the University of Paris, and of a great many other commissions and committees, both foreign and of France.

Prof. Guignard has largely contributed to research by his investigations of diastases, glucosides and principles which furnish cyanhydric acid in various plants, and the con-

M. LEON GUIGNARD.

stituents of the *cruciferous* and other families. To him is also ascribed much knowledge relative to mucilage secretion that exists in the *Laminaires* and of the oleoresins of the *Copaifera* and of other leguminous plants, and also valuable studies on the origin and structure of seeds of a large number of plant families.

EDWARD WATERS WHITESIDE.

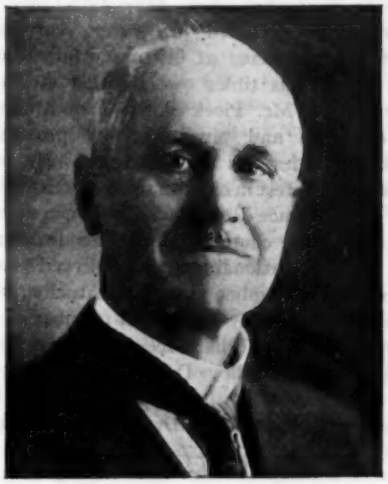
Edward W. Whiteside, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, of Washington, D. C., died May 9th, aged 60 years. The deceased had conducted a pharmacy at 1921 Pennsylvania Ave., for many years, succeeding his brother, Benjamin F. Whiteside. He was highly regarded by the drug trade and his patrons, evidenced by the large number who attended the funeral services, among whom were several Baltimore pharmacists. Dr. Whiteside was a member of the District of Columbia Druggists' Association, the Washington Wholesale Drug Exchange, serving as its director for many years; a member of the District of Columbia Veteran Druggists' Association, also a director of the Twentieth Street Branch of the Merchants' Bank & Trust Co.

The deceased was a member of the Western Presbyterian Church, of Hiram Lodge of Masons and of the City Club.

WILLIAM ALANSON HALL.

William Alanson Hall was born in Morris, Connecticut, September 10, 1860. He entered Sheffield Scientific School of Yale taking the course in Biology, graduating with honors in 1882.

After graduation he went to Greenville, Mich., and was engaged by G. R. Slawson, acquiring an interest in the business which he later sold out and in 1897 purchased the old Inglis Store, corner of Griswold and State in Detroit. He continued in business until 1918 when conditions changed, making a professional store impractical in that locality. Recognizing the great value of his services Mr. Seltzer purchased Mr. Hall's stock who then associated himself with Mr. Seltzer giving all his time to professional work and



WILLIAM A. HALL.

scientific research which was particularly congenial to him and for which he was signally fitted. He was thus enabled to spend much time on the work of the United States Pharmacopœia and National Formulary revisions, being on the committee of the latter for the last three revisions. The effort he expended in this work can only be appreciated by those associated with him on these committees. In 1914 he presénted a paper on Bichloride

Poisoning to the A. PH. A., then meeting in Detroit, which has been fruitful of many successful treatments.

He married Miss Ellen Madison of Greenville, Michigan, from which union were born three children, all of whom died in infancy. Mrs. Hall died January 25, 1923. Mr. Hall was member of the AMERICAN PHARMACEUTICAL ASSOCIATION, joining in 1884, and the M. S. P. A., being President of the latter in 1904, and was an active member in both organizations.

Always interested in church and charitable work, both he and Mrs. Hall were, for many years, very active in the Forest Avenue Presbyterian Church in which he was an elder. After Mrs. Hall's death and up to his death he was a member of the First Presbyterian Church. Mr. Hall died after a short illness May 23, 1928.—L. A. S.

EDWARD LUDWIG PIECK.

Edward L. Pieck, member of the AMERICAN PHARMACEUTICAL ASSOCIATION for more than 30 years, died at his home at 6th and Main Streets, Covington, Ky., May 13th, aged 69 years. The deceased for many years conducted a pharmacy at 6th and Main streets and at various times owned other stores in Covington. Mr. Pieck was one of a family of druggists and physicians, all prominent in their professions in Covington. He took an active interest in civic affairs and was a member of the Grace Reformed Church, a former police and fire commissioner and a director of the Peoples' National bank. He served several terms as a member of the Kentucky State Board of Pharmacy and was a member of the Kentucky State Pharmaceutical Association and the Ohio Valley Druggists' Association. He is survived by his widow, Frances Hill Pieck, and a brother, Dr. Charles Pieck.

THEODORE CAMPBELL.

Theodore Campbell, member of the AMERICAN PHARMACEUTICAL ASSOCIATION and a former President of the Pennsylvania Pharmaceutical Association and proprietor of a pharmacy at 2101 North 63rd Street, died May 1st at his home in Overbrook avenue. Mr. Campbell was born at Daretown, N. J. and went to Philadelphia while still a young man, where he was graduated from the Philadelphia College of Pharmacy and Science, in recent years serving the college as a trustee. He was active in politics for many years, serving in the state legislature for ten years and for nine years as a member of the thirty-fourth district school board. He was a member of the Philadelphia Association of Retail Druggists. Mr. Campbell is survived by his widow, a son and a daughter.

Mrs. Charles O. Lee, wife of Prof. C. O. Lee, of Purdue University, died May 30th. Mrs. Lee was the daughter of Dr. Haggard, of Indianapolis. She is survived by her husband, two children, mother, father and sister.

Frank M. Adams, brother of our fellow-member—Secretary-Treasurer Walter D. Adams of Texas Pharmaceutical Association—died May 14th, aged 70 years. The deceased was engaged in the drug business, in Forney, for many years and also held the office of City Secretary.

J. J. Schott, veteran druggist of Texas, died at his home in Galveston last month. He had been in business near the present location of Schott's Pharmacy for more than sixty years and during these years filled about a million and half of prescriptions (originals).

Dr. Hideyo Noguchi, bacteriologist with the Rockefeller Institute for Medical Research, New York City, and a foremost figure in scientific medicine, died from yellow fever at Acera, Gold Coast Colony, Africa, May 21st. He had contracted the disease in the course of an investigation of its source in Africa and its transmissibility.

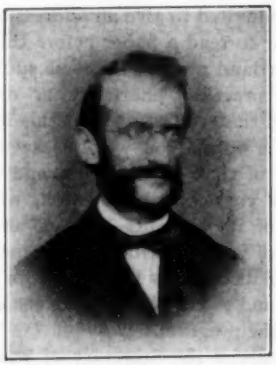
Lieut. Paul Evert, brother-in-law of Dr. A. G. DuMez, Editor of the YEAR BOOK, A. PH. A., was killed by lightning May 30th. He was a participant in a National elimination balloon race contest and pilot of army balloon No. 3, which was struck by lightning. Mrs. Evert and two children survive the deceased. Sympathy of the membership is expressed.

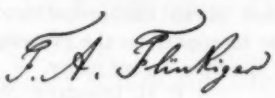
George F. Harvey, President of the National Drug Company, Philadelphia, and founder of the George F. Harvey Company (now the Harvey Company, Saratoga Springs, N. Y.) from which he retired in 1900, died April 24th, at his home in Edge Hill, near Philadelphia. He was eighty-five years old. A widow and daughter survive.

CENTENARY OF FREDERICK AUGUST FLÜCKIGER.

This is the centenary year of the birth of Frederick August Flückiger, an honorary member of our ASSOCIATION, who died at his home in Berne, Switzerland, December 11, 1894. He was born May 15, 1828, at Lengenthal, Switzerland.. The foundation for his future greatness was laid in the elementary

schools, in which he took a thorough course after which he began to devote himself to the study of pharmacy. At the completion of his apprenticeship he continued in his chosen profession at Burgdorf. He lent his individuality to his pharmacy to such an extent that its reputation was not confined to its city, but spread until it was known far from home. The druggists, chemists and physicians, in the country round about, made use of this store as their rendezvous. In 1860, Dr. Flückiger was elected State Pharmacist of Berne, and soon became a conspicuous figure of the University, becoming in 1871 an adjunct professor in that institution. Two years later he received an appointment to a professorship in the King William University at Strassburg, where he also became Director of the Pharmaceutical Institute and President of the Examining Commission. He withdrew





from Strassburg in 1892 and retired to private life in his native Switzerland.

Dr. Flückiger was well known not alone as a teacher, but his contributions to pharmaceutical literature have given him an even wider reputation. He is best known to the pharmacists of America, as one of the authors of the Pharmacographia, which he produced conjointly with Daniel Hanbury. This work shows the patience, hard work and thoroughness, which were characteristic of the man. This, however, is by no means the extent of his labors in this line, he being the author of several other books, some of which have been translated into English, and of many valuable contributions to foreign pharmaceutical periodicals. Before leaving Switzerland for Strassburg, he was for many years the chief officer of the National Apothecaries' Association there. Deceased was elected an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1868.

The half-tone and signature herewith have been reproduced from a photograph of the Maisch album.

In a related connection we desire to make a correction of the legend under the half-tone of Professor Attfield in the May number. The photograph from which this was made is also from the Maisch album and the age at which time the photograph was taken of Professor Attfield was 37, a type error having been made.

The Gesellschaft Für Geschichte Der Pharmazie has published a sketch of Dr. Flückiger by Privatdozent, Dr. J. A. Häfliger of Basel. The booklet has nine illustrations: On the cover, a picture of Dr. Flückiger; the Flückiger Medal which was founded in 1892, a certificate as Honorary Member of the Pharmaceutical Society of Great Britain, of the Pharmaceutical Society of Brussels, of the Society of Natural History of Switzerland, certificate of Honorary Membership in the College of Pharmacy in the State of New York, certificate of the Italian Pharmaceutical Association of the Austrian Society, and finally a half-tone of the grave of Professor Flückiger in Berne.

The late Dr. Frederick Power, who, as far as our records show, was the only American to whom the Flückiger Medal has been awarded. Dr. Power was the author of a translation of the "Cinchona Barks," by Flückiger and of a translation of the "Principles of Pharmacognosy," by Flückiger and Tschirch.

Several years ago, in writing of Flückiger's visit to the United States (in 1894), Dr. Edward Kremers referred to the Squibb-Flückiger letters to be published, which he (Dr. Kremers) said, "seem more like a contribution to Flückigeriana than to the life of Squibb and such to an extent they are, yet they bring out the relation of friendship in the life of Dr. Squibb known to very few, for not only was Flückiger Squibb's guest while on this side of the Atlantic but the entire trip was made possible by Dr. Squibb. The immediate reason for publishing these letters is not so much to call attention to the visit on our shores of the father of modern pharmacognosy as to cause any one who has letters of either Squibb or Flückiger to loan them to the writer (Dr. Kremers)."

SOCIETIES AND COLLEGES.

SCIENTIFIC SECTION A. PH. A.

The seventy-sixth annual convention of the AMERICAN PHARMACEUTICAL ASSOCIATION will be held at the Eastland Hotel in Portland, Me., during the week of August 20, 1928.

The officers are planning to make the sessions of the Scientific Section as instructive and interesting as possible. In order to do this, however, it is necessary that they have your coöperation and assistance and are, therefore, depending upon you for at least one paper upon any subject coming within the scope of the section.

There is no limit as to the length of papers presented, but in order that all may have an equal opportunity to read their papers, attention is again called to the fact that the By-Laws of the Section limit the time allowed for the presentation of each paper to ten minutes, with an additional five minutes for discussion.

The value of the meeting depends as much, and sometimes more, upon the character of the discussions as upon the papers presented. The officers are, therefore, again asking each author to help enhance the value of the discussion by submitting to the Secretary a 250-word, or less, abstract of each paper to be presented.

The Secretary will mimeograph these abstracts and distribute them to the Section members in order to determine the papers in which they are most interested and can come to the section-meetings prepared to intelligently discuss them.

As a reward for promptness in sending in abstracts of papers, arrangements are being made with Science News Service, and various scientific publications, to give publicity to the papers which will be presented before this section.

Only abstracts which are received promptly will be of service for this purpose. The officers trust, therefore, that they may receive the title and abstract of your paper at the *earliest possible date.*

If it is impossible to forward your titles and abstracts in time for advance publicity, please endeavor to have them in the hands of the Secretary by July 1st.

Papers received after July 1st cannot be assured of a place on the program and presentation can only be permitted as time may allow.

The program must be completed by this date in order to have it included in the JOURNAL the month before the meeting.

It is hoped that you will coöperate in making the sessions of the Scientific Section A BIG SUCCESS by contributing at least one paper.

PAUL S. PITTENGER, *Secretary.*
L. W. ROWE, *Chairman.*

SECTION ON PRACTICAL PHARMACY AND DISPENSING, A. PH. A.

The officers of the Section on Practical Pharmacy and Dispensing of the AMERICAN PHARMACEUTICAL ASSOCIATION are endeavoring to formulate a program for this Section at once. It is desired to make this an outstanding attraction at the annual meeting to be held at Portland, Maine, August 20th to 25th, and it is hoped to secure your services and assistance in making the program a success.

You are invited to give an address or demonstration or to read a paper before this Section at the Portland meeting on some subject dealing with practical pharmacy or dispensing. If you feel that you can accept this invitation, which it is hoped you will, please notify the Secretary of that fact at once, and send him the title of your contribution along with a brief abstract of its contents as soon as possible. The title of your contribution together with an abstract of its contents is required for publicity purposes and so that it will be given its proper place on the program.

Please advise the Secretary at your earliest convenience as to the probability of your being able to appear on the program, and let him have the title of your paper.

P. H. DIRSTINE, *Secretary.*
ADLEY B. NICHOLS, *Chairman.*

ALL SECTIONS OF THE A. PH. A. ASK FOR YOUR COÖPERATION.

The names of the Section officers will be found on page 519. Send them titles of papers you will present. The substance of that which is stated in the foregoing messages *to you* applies to all of the Sections.

N. W. D. A. ACTIVITIES.

The Committee on Education and Research of the N. W. D. A. is sending out lithographed posters for "vacation needs" windows.

A third edition of the N. W. D. A. census of wholesale drug salesmen has been published. The total number of salesmen is nearly 3500,

averaging one salesman for approximately 16 of the 53,560 retail drug stores.

The Druggists' Research Bureau is now working on its second film, "Planned Selling" in the series of stock simplification. Film No. 1 is to be exhibited with lectures at the 27 conventions of state associations to be held in June.

PHARMACY HEADQUARTERS BULLETIN.

The recently issued *Pharmacy Headquarters Bulletin* is in the form of an eight-page rotogravure newspaper containing pictures of various colleges of pharmacy. This was prepared under direction of Dr. E. L. Newcomb, Director of Publicity for the Pharmacy Headquarters Fund. It is hoped that the schools and colleges of pharmacy will become interested so that a more extended distribution of this bulletin can be made.

COMMITTEE ON PHARMACY WEEK MEETS.

A meeting of some of the members of the Committee on Pharmacy Week met with Chairman Robert J. Ruth, on June 8th in the Drug and Chemical Club, New York City. At that time samples of display posters and plans for the Pharmacy Week to be held during the third week in October were considered.

The N. W. D. A. will offer samples of lithographed window display posters in colors, and preliminary plans call for the posters to give more than usual emphasis to the professional services of the druggist instead of to the many side-lines.

PLANT SCIENCE SEMINAR.

The following letter has been addressed to participants of former seminars and others:

"*Greetings.* A few more weeks and another term will be over, giving us a chance to make our plans for the summer. Of course you have planned to attend the next Meeting of the Plant Science Seminar to be held at the Massachusetts College of Pharmacy during the week of August 13th, so let's come down to business.

"The High Mufti at Boston and his obedient Adlatus (paucitas ego) in the "Wilds of Long Island" have done some thinking (that means of course: he did the thinking) and reached the conclusion that it would be advisable to start Monday in the A.M. and close Thursday evening, since some of our members will want to attend the Research Conference at Portland, Me. on Saturday, August 18th. This would leave us all day Friday to take in Boston, etc., etc., and be ready for the gathering on Saturday.

"Since Prof. Hogstad's 'round table' idea last year was such a success, it is planned to follow it generally; in fact, make the whole session one long and continued round table session, rather than one of paper reading. That, of course, does not mean to rule out papers entirely and if you have made up your mind to present some five or ten, please don't hesitate, send us the titles. At the same time, however, we would be pleased to have you send us suggestions as to what matters pertaining to our interest might be advantageously brought up and discussed.

"As an Advance Notice—the following attractions are so far considered.

"1. Address of Welcome, by Dean Bradley, of Boston.

"2. Auto-trip to the historic Revolutionary shrines at Lexington and Concord.

"3. Visit to the Arnold Arboretum at Jamaica Plains.

"4. Visit to the Glass-flower collection at Agassiz Hall.

"5. Trip to Gray Herbarium and University Botanical Gardens, Cambridge.

"6. Botanical excursions.

"7. Business meeting and *Collection of Dues* on Thursday evening.

"8. *Ad libitum*—all day Friday.

"9. Surprise party by Geheim-Rat Amrhein —nothing definite known about it, but supposed to be of an exploratory nature.

"We would consider it a special favor if you will kindly send in your notice of attendance so that proper arrangements can be made as to housing. If you have special desires, please make them known to the Committee."

O. P. M. CANIS, *Secretary.*
H. W. YOUNGKEN, *Chairman.*

AMERICAN PHARMACEUTICAL ASSOCIATION MEMBERSHIPS.

The following memberships in the AMERICAN PHARMACEUTICAL ASSOCIATION have been awarded to students in Colleges of Pharmacy. Some have been mentioned elsewhere and notice of others will gladly be made, *when advice is received.*

University of Illinois: Donald William Drake, Pharmacy; Ernest R. P. Kirch, Chemistry; George A. Riendean, Jr., Materia Medica.

Duquesne University: Edward J. Hadel, Pharmacy; W. A. Maslowski, Chemistry; H. Herman Eisenberg, Materia Medica.

Massachusetts College of Pharmacy: For the best record in all senior subjects, to George T. Dickson; Pharmacy, awarded to Richard H. Gowen; Analytical Chemistry, awarded to Herman L. Tritter; Organic Chemistry, awarded to Dora G. Cabit; Materia Medica, to Joseph V. Giberti; Commercial Pharmacy, awarded to Isadore H. Shapiro.

University of Iowa: Excellence in Pharmacognosy, to Harold L. Eaton; Practical Pharmacy, Jacques F. Briceland; Organic Chemistry, Patrick H. Dougherty; Practical Pharmacy (subscription to JOURNAL), Gailerd G. Jones (freshman).

AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION.

We are taking the liberty of abstracting the following from the report of the meeting of the American Pharmaceutical Manufacturers' Association in the *Oil, Paint and Drug Reporter* of June 11th.

"Creation of a research board, composed of the chief chemists of the member firms, for the interchange and collation of scientific and technical information was one of a number of forward-looking steps taken by the American Pharmaceutical Manufacturers' Association in its twenty-first annual meeting. This action and that in most of the other instances followed recommendations made by the President R. Lincoln McNeil, of Robert McNeil, Philadelphia.

"The pharmaceutical manufacturers were in session four days. Attendance at the meeting, both in total registration and in the number of member firms represented, was the largest on record. Rain interfered somewhat with the entertainment side of the meeting. But, all told, it is regarded as having been satisfactory and successful."

Other resolutions adopted by the meeting had to do with the following matters:

Establishment of a representative at Washington.

Coördination of publicity to stress the relation between pharmacy and medicine.

Appointment of a special committee to study distribution methods.

Devotion of next mid-winter meeting to consideration of a standard classification of distribution costs.

Devotion of next annual meeting principally to discussion of greater economy and efficiency in distribution.

Undertakings of a census of dispensing by physicians.

Conference of drug industry with the Federal Trade Commission looking to the defining and eliminating of unfair trade practices.

Endorsement of legislation for the maintenance of resale prices.

Protesting against unnecessary regulatory legislation.

Study of the taxation by a state of corporations located in other states.

"The presidential address of R. Lincoln McNeil was received with enthusiasm and was commended often during the meeting as an able study of conditions and the needs to which they give rise.

"The report of the treasurer, C. N. Angst, showed a surplus of some $1500 for the year and a balance of more than $4700 on hand."

Officers were elected follows: *President*, R. Lincoln McNeil, Philadelphia (reëlected); *Vice-Presidents*, B. B. Grubb, Lafayette, Ind., and E. T. Kirkland, Decatur, Ill.; *Secretary*, J. G. Searle, of Chicago (reëlected); C. N. Angst, Indianapolis (reëlected). The following retiring directors were reëlected for three-year terms: Dr. A. S. Burdick, North Chicago, Ill.; H. F. Snider, Rochester, N. Y.; Dr. C. H. Searle, Chicago.

J. K. Lilly, in an address at the banquet, gave an interesting account of the development of pharmaceutical manufacturing.

Other speakers were L. E. Warren, Charles G. Merrell and E. G. Eberle.

OFFICERS OF THE PROPRIETARY ASSOCIATION.

The following officers were reëlected at the 46th meeting of the Proprietary Association convened at Hotel Pennsylvania, New York City, May 8–9th.

President, Frank A. Blair, New York; *Vice-Presidents*, E. K. Hyde, Buffalo; J. H. Howe, St. Louis; *Secretary-Treasurer*, Charles G. Tyrrell, Syracuse; *Members of Executive Committee* to fill terms expired, J. F. Hinds, Z. C. Patten and A. H. Beardsley.

A forward-looking step was taken during the convention by the creation of a technical section of which Philip I. Heuisler is the Chairman. Treasurer C. W. Holton represented the A. PH. A. at the convention. A number of interesting addresses were made; among the speakers were Dr. Paul G. Dunbar, G. W.

Hoover, James J. Durrett and T. W. Delhanty. Among other representatives of associations were Secretary Samuel C. Henry, Dr. E. L. Newcomb and Frank E. Holliday.

JOINT MEETING OF WASHINGTON AND BALTIMORE VETERAN DRUGGISTS' ASSOCIATION.

The District of Columbia and Baltimore Veteran Druggists' Associations held a joint luncheon in Annapolis, Md., May 22nd at Carvel Hall. There were about forty present from Washington and more than half of that number from Baltimore. Dr. A. C. Taylor, Secretary of the District of Columbia organization opened the meeting and R. E. Lee Williamson of Baltimore presided. Recently departed fraters, Walters and Whiteside, were memorialized by tributes to their sterling qualities.

The occasion was a most happy one and it is very likely that other joint meetings will be held of these two organizations.

THE VISIT OF THE GERMAN APOTHECARIES.*

The German apothecaries who visited in New York, Philadelphia, Washington, Mt. Vernon, Cincinnati, St. Louis, Chicago, Milwaukee, Detroit, Niagara Falls and Boston, have returned to their homes. The speaker of the party was Dr. Wilhelm Wartenberg, of Berlin; others of the group were: Richard Bretschneider, of Annaberg; Fritz Domschke and Ernst Eckert, both of Nuernberg; Max Friedlaender, of Spandau; Ernst Grube, of Naumburg, a. S.; Felix Gruschwitz, of Darmstadt;[1] Johann Hassler and Dr. Hans Meyer, both of Berlin; Dr. Eva Jablonski and Mrs. M. Lichtenstein, both of Breslau; Franz Laws, Berlin-Weissensee; Udo Puteanus, of Wattenscheid; Gerhard Rehbock, of Papenburg-Ems; Alfred Rieder, of Kenzingen-Baden; Julius Siegman, of Spandau; Richard Szamatolski, of Frankfort, a. M.; also Otto Paul, Ferd. H. Roehrig, Otto Stiebeiner, Otto Trapp, W. Kremser and Paul Werner.

Editor Hugo Kantrowitz accompanied the delegation throughout its trip in this country. The first entertainment participated in was the Dinner of the New York Branch A. PH. A., honoring the Remington medalist, Prof. Charles H. LaWall and, thereafter, in all of the cities visited fraternal courtesies were extended. It would require pages to go into details, and mention of individuals, institutions and organizations would be a very incomplete report of the reception given the visitors, therefore suffice it to say that they enjoyed and appreciated the hospitalities, and pharmacists of the cities named gave them a fraternal welcome, joined by some from other cities.

* Group picture of visitors—Courtesy of *Apotheker-Zeitung*—is shown on page 605.

[1] Editor of the *Apotheker-Zeitung*, official organ of the German Apothecaries' Society.

PARTICIPATION IN BRAZIL PHARMACY CONGRESS URGED.

The Second Brazilian Congress of Pharmacy will be held from September 15th to September 17th in the city of Sao Paulo, and it has been suggested that it would be desirable for the publishers of American magazines dealing with pharmaceutical matters to participate, states a report from Consul C. R. Cameron, Sao Paulo, made public by the Department of Commerce.

Except in isolated cases, the report states, the medical class of the country, because the vast majority of the texts studied by Brazilian medical and pharmaceutical students are in French, and French medical and pharmaceutical journals are widely read by doctors and pharmacists, is absolutely ignorant of the great advances in American medicine which have taken place since the World War, and which in many branches of investigation, has wrested the leadership from Europe and attract every year great numbers of European specialists desiring to acquire the latest development in American investigation and American technique. The AMERICAN PHARMACEUTICAL ASSOCIATION has taken the matter up with Consul Cameron.

Vice-President Joseph Jacobs attended the meeting of the Georgia Pharmaceutical Association as representative of the AMERICAN PHARMACEUTICAL ASSOCIATION. He addressed the convention and presented the Association with a mahogany gavel made from the newel post of the stairway in the first home occupied by Dr. Crawford W. Long in Athens, Ga., discoverer of ether anaesthesia. The gavel was embellished with silver and appropriately worded. The gift is in recognition by the Long family of the efforts put forth by Georgia Pharmaceutical Association in sustaining Dr. Long's claim as the true discoverer of ether anaesthesia. Dr. Jacobs was an apprentice in the pharmacy of Dr. Long and life-long friend.

LEGAL AND LEGISLATIVE.

NARCOTIC EXEMPTIONS FOR EXPORT OFFERED IN BILL.

A bill to give narcotic preparations, exempt under the Harrison Act, a similar status in export trade is before the Committee on Ways and Means of the House of Representatives. It was introduced by Representative John F. Miller, of Washington, co-author of the Miller-Jones Act, which regulates the import and export of narcotic drugs.

The committee has referred the bill (H. R. 12,690) to the Federal Narcotics Control Board. L. G. Nutt, Secretary of the Board, says that the measure has been considered at one meeting of that body, and will be further considered before a report is made to the House Committee.

Export permits, required under the Miller-Jones Act, would not be necessary, under the proposed amendment, for the exportation of preparations to which the Harrison Act does not apply, when exported for medicinal use and not for the purpose of evading the purpose and provisions of the Miller-Jones Act. The amendment has been introduced largely as a result of efforts on the part of the American Drug Manufacturers' Association. Carson P. Frailey, Secretary of the association, has asked for an early hearing before the Committee of Ways and Means.

REDUCTION IN NARCOTIC TAXES.

President Coolidge has signed the Revenue Bill which includes a provision reducing from $6.00 to $3.00 the annual tax on retail dealers in narcotics. Importers, manufacturers, producers or compounders of narcotics are taxed $24.00 a year, wholesale dealers $12.00, physicians, dentists and veterinarians $1.00 per year.

PUBLIC HEALTH BILL VETOED.

President Coolidge has vetoed the Parker Bill for reorganizing the Public Health Service. The principal reason given was that the bill contained an appointment procedure which violated the constitution, with the additional objection that the bill intended to militarize a civilian service. The President suggested changes which, if made, would meet with his approval, and discussions of this will be had prior to the convening of Congress.

INVESTIGATION OF CHAIN STORES

With the progress of the Capper-Kelly bill and provision for the investigation of chain store methods the public is becoming more interested in the subject and, after all, in the final analysis the public will decide whether it is best to have the large combinations or not. There is no doubt that partly what seemingly is advantageous will prove to be otherwise when some of the methods of the chain stores are carefully studied. **Grant Clark,** druggist of Genesee, Idaho, has recently inserted a full page message in his home paper on the subject, in which he discusses some of the disadvantages of the chain store.

Martin J. Noll, H. C. Tindall, F. H. Fricke and **W. A. Ackenhausen** made a trip by plane to Washington in the interest of the Capper-Kelly bill, prior to the close of Congress.

SLACK-FILLED PACKAGES.

Mr. Haugen of Iowa has presented an amendment to the Food and Drugs Act entitled: "An Act for preventing the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines and liquors, and for regulating traffic therein, and for other purposes," approved June 30, 1826, as amended. The bill would amend the Food and Drugs Act by adding a new paragraph to Section 8, which deals with misbranding, the effect of which would be to bring within the statute containers for foods which are made, formed, or shaped so as to mislead purchasers as to the quantity, quality or kind of their contents. A new paragraph would also make such containers illegal if, notwithstanding the fact that contents are plainly marked in terms of weight, measure or count, the container itself is slack-filled, *i. e.*, filled in such a manner as to deceive purchasers. In the enforcement of this section of the statute reasonable tolerance would be allowed to care for shrinkage or expansion of contents from natural or other causes beyond reasonable control. No penalties would be enforced for six months after the bill becomes law. (*H. Rept.* No. 590.)

INTERPRETATION OF GOVERNMENT POLICY IN REGULATING THE LABELING OF DRUGS.

Circular 21, relating to Labeling of Drugs, etc., may be obtained from the Department

of Agriculture. In it will be found interpretation of the Government's policy in regulating the labeling of Drugs. Every phase of the law is briefly discussed, relating to the scope of the Act, definition of drug, declaration of drugs in preparations, of alcohol, and duty of the manufacturer in his statements and advertising. The following information is taken from the circular:

Requests for Information Regarding Specific Preparations.—The Bureau is authorized to give information concerning the quality and composition of preparations upon the market only in the form of notices of judgment published after court action, as authorized by Section 4, page 23, *Circular* 21. Requests for information concerning specific products can be compiled with only in those instances where notices of judgment are available.

Requests for Analysis.—The examination of samples of medicinal preparations is limited to those of an official character collected by authorized agents of the Department. Requests for analysis cannot be compiled with, since no authority or appropriation exists for such work.

Statement of Weight, Measure or Count.—The Act does not require that the label of drugs shall bear a statement of the weight, measure, or numerical count of the contents of the package, but any statement of this nature should be correct and complete.

Toilet Preparations.—The Act deals with foods and drugs, the term "drug" being defined in Section 6, page 24, *Circular* 21. A toilet preparation that is not intended or represented, directly or indirectly, to be useful for the cure, mitigation, or prevention of disease is not subject to the law, but the manufacturer should exercise care that it does not contain any ingredient that might be injurious to health.

Narcotic Act and Prohibition Act.—Narcotics and alcohol are subject to the provisions of the Harrison Narcotic Act and the prohibition act, as well as to the provisions of the food and drug act. Information regarding these two laws may be obtained from the Bureau of Internal Revenue, Washington, D. C.

Postal Laws.—The postal laws and regulations contain provisions as to drug products coming within their scope. Information on this subject can be obtained by addressing the Postmaster General, Washington, D. C.

Patents and Trade Marks.—The Department of Agriculture can give no advice on patents or trade marks. Information on this subject may be obtained by addressing the Commissioner of Patents, Washington, D. C. As far as the Federal Food and Drugs Act is concerned, no patent, trade mark, or copyright is necessary for the manufacture or sale of drug products.

Copyright.—Information regarding copyright privileges may be obtained by addressing the Copyright Division, Library of Congress, Washington, D. C.

Patents, Trade Marks and Copyrights Confer No Exemption.—The issue of a trade mark, copyright, or patent for a preparation does not exempt it from the provisions of the Federal Food and Drugs Act.

State Laws.—State laws may contain additional requirements for the manufacture or sale of medicinal preparations. Information concerning state laws may be obtained from the offices given in the attached list.

BOOK NOTICES AND REVIEWS.

Die aetherischen Oele von E. Gildemeister und Fr. Hoffmann, Dritte Auflage von E. Gildemeister. Bearbeitet im Auftrage der Schimmel & Co. Aktiengesellschaft, Miltitz bei Leipzig. Erster Band, pp. XVI, 864, mit zwei Karten und zahlreichen Abbildungen. Verlag der Schimmel & Co. Aktiengesellschaft, Miltitz bei Leipzig. (Fuer den Buchhandel: L. Staackmann, Leipzig), 1928. Price R. M. 28; in half leather binding, R. M. 32.

Under the caption "Pharmaceutical Bibliography, a Suggestion and an Illustration," the writer, a year ago, pointed out how cooperative effort might be spent advantageously.[1] The subject "Volatile Oils" was chosen because it afforded an excellent illustration. This has been made possible through the efforts of Schimmel & Co. to cover the entire field in all of its aspects. Two years ago the firm celebrated the fiftieth anniversary of its "Bericht." In 1923 the firm published "Einfache und Fraktionerte Destillation in

[1] THIS JOURNAL, 16, 327. For the complete paper see *N. Y. Apt.-Ztg.*, pp. 17, 36, 45 and 48.

Theorie und Praxis," edited by its Chief Engineer, Prof. Dr. C. v. Rechenberg. To-day we are in receipt of volume one of the third edition of "Die Aetherischen Oele," by Dr. E. Gildemeister, one of Wallach's first students, and long and favorably known as the Chief Chemist of the same firm. Both treatises and the annual "Bericht" are published by the firm as supplementary treatises and in the same style so far as bookmaking is concerned. Certainly we have here a unique contribution to scientific literature by a firm that has adhered for more than half a century to the practice of making available to the world the scientific knowledge of its personnel through its splendid publications. It would be difficult to find anything like this anywhere.

That the scientific interest in volatile oils has not abated since the appearance of the three-volume second edition, has been manifested by the appearance of several new treatises on the subject. Welcome as some of these books have been, not one of them can compare as to comprehensiveness with the work of Gildemeister. The older four-volume work by Semmler, "Die Aetherischen Oele," was not so much a treatise on volatile oils as an exhaustive study, for its time, of the chemical constituents of the volatile oils. It has not been revised and is not likely to appear in a second edition.

Eighteen years have elapsed since the appearance of volume one of the second edition. Eventful years primarily as to world relationships, eventful also in the field of volatile oils. The chapter "Hauptbestandtheile der Aetherischen Oele" had to be adapted to the ever increasing knowledge of the chemistry of these interesting plant substances. Likewise the chapter "Die Pruefung der Aetherischen Oele" had to be brought abreast of the more refined practices of sophistication.

Those of us who are specially interested in this field of research feel grateful to the author for having undertaken the second revision and having seen the first volume through the press. To the firm we express our thanks for having permitted Dr. Gildemeister to absent himself from the arduous duties of Chief Chemist and to withdraw to the quiet of the Harz Mountains where the severe task of revision has been made possible.

The work is too well known by this time to call for any detailed comment. May other firms follow the good example and provide us with much wanted literature in their respective fields of plant chemistry.—E. K.

Catalogue of Insects of Importance in Public Health.—The United States Public Health Service has just issued Bulletin 150, Hygienic Laboratory, entitled "Key-Catalogue of Insects of Importance in Public Health." This represents the fourth catalogue in this series of key-catalogues on medical zoölogy issued by the Service.

Ordinarily, insects in their relation to health and disease are viewed chiefly from the standpoint of being either external parasites, such as lice and fleas, or transmitters of disease, such as mosquitoes in the case of malaria and fleas in the case of bubonic plague. The present publication carries the subject much more into detail. In the body of the bulletin numerous insects are arranged systematically according to their more or less generally adopted classification with notation as to their public health importance and their geographic distribution. In the introduction, the different genera of insects are cross-referenced to the following subjects:

A, biting insects; B, on cadavers or in graves; C, control of public health pests; D, dermatology (lesions, dermatitis, eruptions, exanthema, parasites, urticaria); E, edible (food, drink); F, excreta; G, food and drink; H, jurisprudence; I, laity (fear, superstition) J, parasites and pseudoparasites (abdomen, ear, external, eye, head, intestine, miscellaneous mouth, nose, stomach, subcutaneous, throat, urinary system); K, pests (books, clothes, drugs, records, miscellaneous); L, pinching insects; M, poisons (arrows, defensive, food, spines, miscellaneous); N, pollution (air, water); O, stinging insects; P, therapeutics (lay, professional); Q, vectors (Aspergillus, bacteria, filth, Protozoa, Trematoda, Cestoda, Nematoda, Acanthocephala, Insecta).

The publication is of special interest to public health officers, physicians, pharmacists, zoölogists, lawyers, and students of medicine, pharmacy, and zoölogy, and forms a condensed summary of the entire field of public health entomology.

The work has been prepared by Prof. C. W. Stiles, of the U. S. Public Health Service, and Dr. Albert Hassall of the U. S. Bureau of Animal Industry, on basis of their personal observations combined with thousands of references to the literature indexed in the Government card catalogue.

Make your arrangements early for the Portland, Me., Convention.